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ABSTRACT

The present study drew on existing theories and research to further uncover the mysteries of the college teaching/learning paradigm, particularly the causal links between effective instruction and student learning of novel lecture material. The experimental design involved 380 introductory psychology students and consisted of a Lecture Expressiveness (low, high) by Lecture Organization (low, high) 2 x 2 design. Four teaching conditions were defined by the following manipulations: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, high expressiveness/high organization. The dependent variables included student attention and achievement. The results extended previous correlational research. For instance, organization showed consistent differences in student attention and achievement: (1) organization influenced students' perceived and actual attention; (2) organized teaching impacted students' perceived and actual achievement outcomes; and (3) organized teaching influenced lower levels of information processing. These findings and their implications are discussed at length and suggestions are made for classroom instructors and college students to capitalize on organization as an effective teaching behavior. (Contains 78 references.) (Author/JB)

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An Empirical Comparison of Two Effective College Teaching Behaviors: Expressiveness and Organization

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Abstract

The present study draws on existing theories and research to further uncover the mysteries of the teaching/learning paradigm. More specifically, the causal links between effective instruction and student learning of novel lecture material were examined. The experimental design involved 380 introductory psychology students and consisted of a Lecture Expressiveness (low, high) by Lecture Organization (low, high), 2 x 2 design. Four teaching conditions were defined by the following manipulations: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, high expressiveness/high organization. The dependent variables included student attention and achievement. The results extend previous correlational research. For instance, organization showed consistent differences in student attention and achievement. These findings and their implications are discussed at length and suggestions are made for classroom instructors and college students to capitalize on organization as an effective teaching behavior.

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An Empirical Comparison of Two Effective College Teaching Behaviors: Expressiveness and Organization

Although recent research on college teaching has increased our knowledge of what behaviors constitute effective instruction (Cohen, 1987; Feldman, 1989; Marsh & Dunkin, 1992; Murray, 1991; Perry, 1991) and which student differences constitute adaptive learning orientations (McKeachie, Pintrich, Lin, & Smith, 1986, Perry & Dickens, 1984), there has been a notable lack of progress in understanding the contribution of effective teaching variables in learning conditions. Furthermore, much of the research in this area tends to be atheoretical, lacking suitable conceptual frameworks. Thus, the purpose of this study was to help clarify the teaching-learning process by investigating the links between effective teaching and student learning outcomes. This was accomplished by focusing specifically on how commonly recognized effective teaching behaviors, expressiveness and organization, compare and interact with each other. Below, each section defines the unique set of critical variables of interest, reviews empirical evidence supporting the phenomenon under consideration, provides a theoretical framework, and concludes by identifying the critical hypotheses to be empirically tested.

Effective Teaching Behaviors

Specific instructional methods comprise what is considered as teaching in the college classroom. These include lectures, group discussions, personalized instruction, seminars, and technology (Dunkin & Barnes, 1986). The lecture method was chosen in the present study to define teaching for three reasons. First, it is still the pervasive style of presenting knowledge in the college classroom (Dunkin & Barnes, 1986). For example, more than 70% of instructors reported lecturing as their principle teaching method (Educational Testing Service, 1979). Second, in contrast to most other teaching methods, the behaviors denoting the lecture method, such as expressiveness, organization, clarity, and lecture content, are more easily isolated and manipulated through videotape presentation (e.g., Abrami, Leventhal, & Perry, 1982). The videotape presentation, in turn, provides an ideal format for conducting experimental investigations, since specific teaching behaviors can be held constant, while others are systematically manipulated. Third, literature on the lecture method is more abundant than other teaching methods. For instance, the last twelve years (1982-1993) of the United States Educational Resource Information Center database (1994) revealed more single article citations for the lecture method (N = 2182), than for seminars (N = 1939), group discussions (N = 639), technology (N = 100), or personalized system of instruction (N = 96).

Research on teaching behaviors basically consists of two methodological approaches: observational and experimental. In observational studies, behaviors are observed and then correlations are drawn between teaching behaviors and student outcome measures. The experimental approach, on the other hand, manipulates one or more teaching behaviors while holding all other factors constant and determines the impact that these behaviors have on student learning outcomes. Rather than attempting an exhaustive review of the research to date, the next section will focus on the important studies that exemplify these research approaches.

Descriptive Studies

Field studies have demonstrated effective teaching behaviors over the past seven decades (McKeachie, 1990). Research was initially descriptive and unstructured, relying on students' spontaneous open-ended responses (Epstein, 1981; Hildebrand, Wilson, & Dienst, 1971; Uranowitz & Doyle, 1978). A myriad of descriptions defining effective teaching were revealed. Student responses were summarized and clustered into closely related dimensions, such as personal attributes and subject mastery (Sheffield, 1974). Based on these initial research findings, a number of evaluative ratings and observational questionnaires of effective teaching have been generated.

These instruments, in turn, have been completed by countless students (see Marsh, 1984) and have been subjected to factor-analysis and meta-analysis procedures in order to identify specific effective teaching behaviors. These procedures have found anywhere from 2 to 28 mathematically distinct behaviors (Cohen, 1981; Feldman, 1989; Frey, 1978; Hildebrand et al., 1971; Solomon, Rosenberg, & Bezdek, 1964). For instance, in a series of studies, Feldman (1984; 1989) expanded the range of teaching behaviors that Cohen (1981) had initially observed in his meta-analysis. Feldman's (1989) list of 28 categories provides the most comprehensive set of teaching behaviors to date.

These teaching behaviors have been subjected to correlational analyses and a number of them have been linked statistically with student achievement. For instance, Table 1 lists 17 teaching categories that Feldman (1989) found to correlate with student achievement. Although important in supporting the strength of the relationship between effective teaching and student achievement, and demonstrating the rank ordering of their strength, these correlations fail to demonstrate the critical causal linkages. According to Feldman (1994), it is still empirically unclear as to which behaviors "are more likely and which are less likely to produce achievement" (p. 21, italics underlined). The present thesis addresses this issue by examining the causal relationship and effect sizes between certain effective teaching behaviors and student learning outcomes.

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Experimental Findings

Descriptive research findings present a consistent picture of the outstanding college teacher. A number of teaching behaviors are repeatedly reported. These reoccurrences have prompted further investigation of the different fundamental teaching dimensions through experimental studies. Of specific interest were expressiveness and organization. These behaviors were selected for the following reasons. First, both are significantly correlated with student achievement. Organization is listed first in Table 1, demonstrating the highest correlation, whereas expressiveness places seventh in a list of 17 teaching behaviors. Also, the correlation associated with organization, in comparison to expressiveness, is almost twice as large, suggesting a higher degree of association with student achievement. Second, both lend themselves to manipulation via videotape format. Third, lectures presented in large amphitheaters, a common occurrence in introductory and distance education, diminish the frequency for other teaching behaviors such as interaction, rapport, and feedback. For these reasons, expressiveness and organization were investigated. A detailed definition of expressiveness and organization, empirical evidence showing their influence on student achievement, and hypotheses regarding the links between each teaching behavior and learning outcomes are provided below.

Expressiveness. Experimental studies have consistently shown that expressive instruction is associated with student learning (Marsh, 1984; Perry, 1991). Low inference behaviors denoting expressiveness include "movement while presenting material", "gesturing with hands and arms", "eye contact with students", "voice inflection", "minimal reliance on lecture notes", and "humor that is relevant to lecture content" (Murray, 1991; Perry, 1991). Expressiveness predicts students' scholastic behaviors such as achievement (Coats & Smidchens, 1966; Mastin, 1963; Perry, 1991), attendance to a delayed lecture and amount of homework completed (Perry & Magnusson, 1987; Perry & Penner, 1990), and paying for additional lecture material (Slater, 1981; cited in Murray, 1991). Expressiveness has also been found to affect outcomes related to students' performance, such as generating a more internal attributional orientation toward achievement (i.e., ability/effort), and increasing positive affects (i.e., pride), self-confidence (i.e., self-competence), and motivation (Magnusson & Perry, 1989; Perry & Dickens, 1984; Perry, Magnusson, Parsonson, &

Dickens, 1986; Perry & Penner, 1990; Schonwetter, Perry, Menec, Struthers, & Hechter, 1993; Schonwetter, Perry, & Struthers, 1994). Thus, expressiveness is not only correlated with, but also causally linked to student achievement and achievement-related outcomes.

Researchers have taken a cognitive approach to explain the causal links between expressiveness and student learning (Murray, 1991, Perry, 1991). According to Figure 1, both physical movement and voice intonation are hypothesized to elicit students' selective attention. Visual and/or audible changes of stimuli in a learning environment tend to elicit student attention. Also, appropriate visual or audible changes associated with important lecture material are thought to provide students with learning cues as to what is considered important and to be learned. Finally, bodily posture and vocal inflection are postulated to make students feel comfortable in the learning environment (Furio, 1987). Thus, body movement and voice intonation may impact student learning.

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The effects of eye contact or eye gaze vary in the research literature. For instance, differential eye contact behavior by an actor produced varied perceptions of attraction, credibility, and relational communication in a group of observers (Burgoon, Coker, & Coker, 1986). Also, eye contact by an instructor produced levels of compliance in students (Hamlet, Axelrod, & Kuerschner, 1984). Furthermore, students presented with eye contact, as compared to no eye contact during a verbal presentation, demonstrated higher recall scores of lecture material (Sherwood, 1987). A number of possible explanations have been provided for these outcomes. Perry (1991) for instance, views eye contact as creating intense interest or challenge of the recipient. Sherwood (1987) and Otteson and Otteson (1979) posit that it increases a sense of personal relationship or intimacy between the student and the speaker. Thus, eye contact appears to play an important role in teaching/learning dynamics.

As can be seen in Figure 1, humor is also posited to influence learning. For instance, it has been instrumental in improving comprehension, enhancing retention (Johnson, 1990), and increasing learning of substantive facts and awareness of attitudes regarding sensitive issues such as death and dying (Safford, 1991). Exposure to humor, as compared to no humor lectures, lowered students anxiety and improved their test performance (Bryant & Zillman, 1988; Ziv, 1988). Moreover, the effectiveness of humor has been directly related to the extent that it is relevant to the material taught and the items tested are related to it (Kaplan & Pascoe, 1977). Humor also promotes a positive and cohesive class environment (Civikly, 1986). Perceived as a valuable teaching skill, humor is thought as maintaining student interest and facilitating acquisition of information in a given topic area (Gentilhomme, 1992). Thus, humor is thought to be an effective component of classroom teaching.

Sometimes referred to as "enthusiasm", expressiveness is thought to be vicariously transferred to the student in the form of increased motivation, such as studying outside of instruction time (Murray, 1991). Students are influenced by environmental variables, such as energetic instructors, modeling the high energy or interest of content material presented. For instance, students who perceive their music instructor as exhibiting more, in comparison to less, expressiveness also enjoyed their music lesson more, reported more positive affects, had a greater desire to learn more, and demonstrated greater exploratory behavior (Cameron, Enzle, & Hawkins, 1992). Thus, a student's tendency to model interest in a given lecture topic may be influenced by the "enthusiasm" or expressiveness of an instructor.

Based on the above low inference behaviors, expressiveness is postulated to facilitate students' selective attention (Murray, 1983; Perry & Dickens, 1984; Williams & Ware, 1976). For instance, expressiveness is thought to provide general stimuli for optimum arousal through the stimulus cueing qualities associated with physical movement, voice intonation, eye

contact, and humor. As a general orienting stimulus, expressiveness indicates "pay attention", "this material is interesting and/or important," and enables students to process relevant information (Murray, 1991), thereby enhancing memory storage and retrieval (Perry, 1991). Selective attention, in turn, is crucial to most types of information processing (Kuhl, 1985; Mayer, 1987).

Stimulating and sustaining of students' interest in a stimulus item may dictate how much attention will be directed toward it. Anderson (1982) explains this phenomenon as follows. As learning occurs, incoming information is processed and evaluated for importance. The amount of attention focused on the stimuli is directly related to the importance of the stimuli. As more attention is directed toward the stimuli, the stimuli are better learned than other stimuli (Anderson, 1982). Accordingly, an instructor who presents interesting material may elevate the importance that students attribute to learning the material. In turn, the amount of selective attention directed toward the material may be enhanced.

Research on instructor expressiveness tends to reveal a number of shortcomings. First, investigation of students' selective attention generated by expressive instruction has been neglected. In response to this oversight, this phenomenon was explored in the present study. Students optimally aroused by expressive instruction were hypothesized to process information more efficiently. In other words, students exposed to expressive instruction should demonstrate higher levels of attending to lecture material.

Second, previous research has failed to control for the influence of other teaching behaviors while investigating expressiveness. For instance, most studies documented in Abrami et al.'s (1982) meta-analysis manipulated the levels of expressiveness and lecture content, but mention little about controlling for other teaching behaviors. Other behaviors, such as organization or clarity, were not recorded as having been controlled. Thus, the present thesis extended this research by controlling for teaching behaviors previously not controlled for.

Organization. Good organization of subject matter and planning of course content are important to student learning (Kallison, 1986). Examples include "the instructor planned the activities of each class period in great detail", "gives preliminary overview of lecture", "puts outline of lecture on board", "uses headings and subheadings", "signals transitions to a new topic", and the "seriation of relevant points" (Feldman, 1989; Murray, 1991). The latter is best described as the enumeration of elements in a series such as "first,...", "second,...", "third,...", and "finally,...". The organized instructor has a well-structured method of teaching which breaks the course into units more readily accessible for information processing (Perry, 1991).

Organization is postulated to provide specific cues for what is to be attended to. This is accomplished through the organization of course material, as seen through well-structured presentations, syllabi, lecture outlines, and seriation of relevant points, headings, and subheadings (see Figure 1). Lecture material presented in the aforementioned ways has a higher probability of being recorded, a factor which, in turn, significantly improves achievement (Hartley & Cameron, 1967; Hartley & Fuller, 1971; Maddox & Hoole, 1975). Intact outlines may serve to guide note-taking, depicting the organization of the main ideas of a presentation. The use of embedded headings and intact outlines with videotaped instruction optimizes both immediate and delayed learning (Frank, Garlinger, & Kiewra, 1989).

In addition to being a specific stimulus cue, organization in the form of outlines represents a knowledge structure, serving as an advance organizer (Glynn & Di Vesta, 1977) and providing students with "chunking" strategies (Perry, 1991). Chunking refers to the process whereby distinct pieces of information are grouped together in order to enhance

memory (Perry, 1991). This knowledge structure represents a set of related categories about the nature of and the relationships between the ideas presented (Rumelhart & Ortony, 1977). As such, it enhances students' integration of content topics by providing a "chunking" strategy for linking new to preexisting knowledge. In other words, it provides a quick and logical method of structuring lecture material (Perry, 1991), which influences comprehension (Meyer, 1975; 1977) and facilitates encoding and retrieval of learning material (Glynn & Di Vesta, 1977). For instance, when the information was organized during learning, students showed better memory of information (Katona, 1940). Also, highly structured teaching has produced significantly better student achievement than less structured teaching (Guetzkow, Kelley, & McKeachie, 1954).

Overall, expressiveness and organization appear to influence student learning, specifically affecting their attention. However, as orienting stimuli, these teaching behaviors may differentially impact students' attentional processes. Expressiveness is assumed to be a general orienting stimulus related to general information processing. For instance, with low expressive instruction, students may perceive lecture material as irrelevant and thus, not attend to it. However, with an increase in expressive behavior, such as the presentation of humor, body movement, etc., students' attention will continue to be engaged as long as expressiveness remains at a high level. Any lecture material presented during this time and for a short time following should be perceived as important and attended to. In other words, the student may listen more intently as if the dynamics of the teaching behavior denote something relevant and worth attending to. Therefore, most learning that occurs under expressive instruction is assumed to occur as a function of associating the dynamic elements of expressiveness (i.e., voice variations) with the presentation of the lecture material. Thus, high expressiveness is hypothesized to act as a general stimulus cue, indicating that the material being presented is relevant.

Organization, on the other hand, is thought to elicit attention to specific lecture material cued by outlines, headings, and seriation of relevant points. These cues tend to be directly linked to what is regarded as important. For instance, a lecture outline provides the student with the relevant stimuli to be learned. Also, the seriation of relevant points not only specifies what is important, but may also dictate the order of importance. Thus, a direct link is thought to exist between organization and the relevant stimuli to be learned. Based on this premise, organization is viewed as a specific orienting stimulus, directing attention to specific lecture material.

In summary, high expressive and high organized instruction should produce an optimal learning environment when all other factors are held constant. The absence of these teaching behaviors, on the other hand, should result in a related information processing deficit, reducing the amount of learning possible. Although Feldman (1989) has demonstrated organization to be more highly correlated with student achievement than expressiveness, a comparison of these two teaching behaviors has yet to be conducted experimentally. Thus, of critical concern to the present thesis is the influence that each of these teaching behaviors has on student learning outcomes.

The Present Study

The first purpose of this study was to examine the relationship between two teaching behaviors and their influence on student learning outcomes. Specifically, two research objectives were addressed. First, Feldman's (1989) ordering of expressiveness and organization was determined experimentally. According to Feldman, organization is more highly correlated with student achievement (r = .57) than expressiveness (r = .35). However, each behavior was hypothesized to have some influence on student learning. The magnitude of the teaching behaviors' main effects, omega-squared values, were compared in order to address this objective.

Second, the combined effects of instructor expressiveness and instructor organization were investigated. It was hypothesized that a symbiotic/antagonistic relationship exists among different teaching behaviors, such that certain behavior combinations are complementary, facilitating student learning (i.e., symbiotic), whereas others are distracting, thwarting student learning (i.e., antagonistic). In order to explore this idea, four teaching conditions were developed: low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization. Although low expressiveness/low organization and high expressiveness/high organization were thought to reflect poor and excellent teaching, respectively, the other two conditions, low expressive/high organization and high expressive/low organization, were thought to represent more typical teaching, differing only in the quality of each of the two teaching behaviors. Based on Feldman's (1989) correlational findings, the low expressiveness/high organization condition was thought to be more influential than the high expressiveness/low organization condition. Thus, six *a priori* comparisons were conducted to address this issue.

Instructor expressiveness (low, high) and instructor organization (low, high), represented the independent variables, whereas student attention and achievement behavior were the dependent variables. Attention was defined by a recall test of the lecture material and self-reported lecture attending. Achievement was denoted by a recognition and an application test of the lecture material, and by a self-report perception of learning. In order to control for extraneous learning variables, such as student seeking help, researching topics in a library, reading from a text, asking the instructor, students were exposed to a one-time instructional episode and presented with novel lecture material.

Method

Subjects

The subjects were 380 introductory psychology students who volunteered for one of 10 two-hour time slots in order to fulfill their course requirements: 85 in the control group (39 males; 46 females; ages: 18 - 45; M = 22.22 SD = 6.39) and 295 in the experimental groups (males = 118; females = 177; ages: 18 - 45; M = 20.87; SD = 4.65).

Materials

Instructional manipulation. Given their effect on student achievement in the college classroom, expressiveness and organization were selected to represent teaching (Feldman, 1989; Murray, 1991; Perry, 1991). Lecture content was held constant by equating the lectures for the number of teaching idea units. This was accomplished by having the instructor use the identical set of lecture notes for all presentations. In order to test the hypotheses, four color videotapes were developed: low expressiveness/low organization; low expressiveness/high organization; high expressiveness/low organization; and high expressiveness/high organization. In each of the videotapes, a female economics professor who had won a number of teaching awards gave a lecture on the topic of "demand", a lecture typically presented to first year economics students.

The videotape presentations varied according to expressiveness defined in terms of eye contact with the videotape-camera, voice inflection in the delivery of the presentation, physical movement depicted by appropriate hand gestures, physical relocation of the presenter around the lectern, and humor reflecting lecture-content material. The organization manipulation included variation of the following behaviors: giving a preliminary overview of the lecture, providing an outline of lecture on the overhead, using headings and subheadings, and signaling transitions to a new topic. These characteristics were decreased and increased in the low and high conditions, respectively.

An Electrohome Color Videotape Projection Unit projected the videotapes onto a 2.2 meter diagonal screen in order to simulate a life-size presentation. Furthermore, the videotape-camera focused on the lecturer at all times during the initial recording session, with the exception of an occasional view of the overhead material. Projection of this format of videotape recording onto a flat screen produces the illusion that the instructor is at all times facing the audience, regardless of the angle of vision that each student's seat represented. In order to enhance the visual effect, students were seated facing the screen within 50 degrees on either side of the perpendicular from the screen. This was done in order to reproduce as close to "life" representation of the lecturer as possible.

Taped lectures rather than "live" presentations were selected for a number of reasons. First, in order to investigate the causal nature of specific teaching behaviors, it was necessary to control for lecture content and presentation variables across all conditions, a task that is easily accomplished through videotaping. Second, comparable effectiveness in demonstrating teaching effects in college classrooms has been maintained through the use of videotapes (Abrami et al., 1982; Perry, 1991; Perry, Abrami, & Leventhal, 1979). Third, videotaped instruction serves as an effective alternative to conventional instruction (Jamison, Suppes, & Wells, 1974).

Finally, training a confederate to provide multiple, yet consistent teaching behaviors in the classroom laboratory would be difficult for a number of reasons. First, due to practice effects, there is a high probability that the last lecture presented will be the best or the worst. Second, fatigue may influence an instructor's presentation, especially when having to present two sets of four teaching episodes. Third, "live" teaching would not permit the control of other teaching behaviors such as interaction, rapport, and lecture content, thereby confounding the effects of the teaching behaviors of interest. Fourth, videotaped lectures also control for teacher biases that are present in "live" teaching situations. Given the consistent teaching behaviors over multiple presentations, the reduction of possible practice effects as well as the control of experimenter bias, the videotape format was chosen.

Classroom analog. The simulated college classroom setting was intended to provide a realistic environment in which to study effective instruction and student differences on student learning outcomes. Behavioral, affective, and cognitive involvement is generally quite high. According to Perry (1991), participants are often highly motivated to provide explanations for the outcome of the achievement event in a classroom analog. Furthermore, investigating instructor characteristics in the laboratory setting is thought to "lead to more precise descriptions of effective teaching behaviors" (p. 461-462; Abrami et al., 1982).

Selective attention. Studies investigating the teaching-learning phenomenon have indirectly inferred student attention from cognitive deficits. For instance, in a summary of the Manitoba Laboratory studies, Perry (1991) stated that "expressive teaching did not enhance learning and performance in helpless students, suggesting that selective attention may have been impaired" (p. 37). However, these studies provided no direct evidence supporting the link between effective instruction and student attention. Based on the difficulty of measuring student attention during learning, these studies relied on the consequences of attention, namely achievement tests.

However, presuming student attention from achievement performance has its limitations. For instance, the achievement measure used in these studies relied on the multiple choice format (Perry & Dickens, 1984; 1987; Perry & Magnusson, 1987; Perry et al., 1986; Schonwetter et al., 1994b). Multiple choice format tests provide cues which enhance students' memory of information processed during the lecture presentation. To define selective attention on the basis of recognition scores is problematic in that student scores may not only be the result of selective attending during lecture presentation, but also the result of cues provided by

the test. In order to address this issue, the present study administered a recall test based on the following reasons. First, a recall test does not provide stimulus cues. Students are given a piece of paper that contains no words related to the lecture and are required to write down all the lecture unit ideas presented. Second, recall has not been used before as a measure of effective teaching and given that it does not provide lecture presentation cues, it can be a better measure of learning than recognition. Although not a direct measure of attention, recall may give greater confidence in concluding that attention is affected. Furthermore, previous research on effective teaching and student learning has not considered self-report measures of student attending to lecture presentation. In the present study, the administration of student lecture attention self-report was hypothesized to provide an alternative method of denoting selective attention.

Thus, selective attention was denoted by a recall test and a self-report item. During the five-minute recall test, students were not provided with any lecture cues, but rather, with a blank sheet of paper on which to record as many of the key words presented during the lecture (i.e., demand, complements, services, goods, etc.). Of the possible 42 lecture unit ideas consistently presented across all four teaching episodes, students scored well below the median (Md = 21; M = 11.87; SD = 3.91; range = 4 - 23). On a single-item, ten-point scale, students identified the extent to which they attended to the lecture (i.e., 1 = "0%"; 10 = "100%"). One student scored 0 on the recall test, representing an outlier (i.e., z = 3.0) and was therefore removed from further analyses.

Lecture achievement test. Most studies have relied almost exclusively on student final examinations as outcome measures (see Murray, 1991). According to McKeachie et al. (1986), final examinations can be poor criteria for differentiating the effects of teaching since they are based primarily on textbook material and therefore poor indicators of learning derived solely from the lecture presentation. Moreover, students may try to compensate for ineffective teaching by additional research or getting help from peers, thereby confounding any teaching effect. In order to avoid this problem, an empirical investigation of teaching behaviors in a controlled environment was conducted where the criteria for learning was the amount of information learned from novel lecture material and not from external sources such as textbooks or peers. Students were exposed to a "one-time" lecture presentation and were then required to write the achievement test.

Furthermore, past studies relying on achievement tests have almost exclusively depended on recognition tests consisting of multiple-choice items (i.e., Perry & Dickens, 1987, Perry & Magnusson, 1987; 1989; Perry & Penner, 1990; Schonwetter et al., 1994b). Although recognition is a measure of student learning, it only represents one dimension of student thinking: knowledge (Bloom, 1956). It involves the correct identification of content from a large array of content with cues. Recognition tests do not force recall, the remembering of content without any cues and therefore, may represent a lower or less in-depth processing of information. A more involved or deeper level of learning is the application of knowledge. This requires the ability to use general principles or ideas presented during the lecture and to apply them to new or novel situations. Compared to previous studies, the present study incorporated recognition and application items to create a more comprehensive definition of learning.

In order to ensure that the material presented was novel, students were screened regarding their experience with the lecture material. Few studies have sought to control students' prior knowledge of content material presented in the lecture manipulation. Two methods were utilized to address this issue here. First, introductory psychology students were exposed to lecture content not directly related to their discipline--an economics lecture. Second, in order to control for prior knowledge effects, students who self-reported economics experience were deleted from the initial sample, i.e., "Have you ever had this material

before?": "Yes" or "No". Obviously, this presents certain limitations for the generalizability of the results.

The achievement test derived from the lecture was composed of 30 multiple-choice items, each item having four choices. Ten items represented recognition, whereas the other items measured knowledge application. The multiple-choice test was designed to be moderately difficult in order to avoid a ceiling affect (M = 15.77; SD = 5.02; range = 4 - 29). Students perceived the test as difficult. For instance, on a 10-point scale (i.e., 1 = "no influence on my performance"; 10 = " a great deal of influence on my performance"), they attributed test difficulty as having an influence on their performance (M = 6.37; SD = 2.33). One student scored 0 on the recognition and application tests, representing an outlier (i.e., z = 3.1) and was removed from further analyses. Given that perceived versus actual learning may be linked to students' cognition, affect, and motivation (Weiner, 1986), students rated the amount that they perceived they had learned (i.e., 1 = "very little"; 10 = "very much").

Procedure

As seen in Figure 2, approximately 3200 students in a multisection introductory psychology course volunteered for one of five sessions in either Week 1 or Week 2. In order to counterbalance the sequence in which each condition was presented during each week, the four experimental conditions and one control condition were randomly assigned to each of the sessions, once in each week. Students in groups of 40-50 came to the simulated college classroom. Students in the experimental sessions completed the prelecture questionnaire, viewed one of four videotaped lectures (low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization), wrote the recall and achievement tests, and completed the post-achievement questionnaire. Students who were in the control group completed the prelecture questionnaire, the achievement tests, and the post-achievement questionnaire. Finally, to ensure an educational learning experience, all students were debriefed.

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Rationale for Design and Statistical Analysis

In order to test the research questions, an Expressive Instruction (low, high) by Organized Instruction (low, high) 2 x 2 design was implemented. First, a Bartlett-Box statistic from SPSS-X MANOVA procedure was employed in order to test for heterogeneity of variance because sample sizes were unequal. With an alpha level of .05 (i.e., $p < .05$), the dependent variables demonstrated no significant effects. Thus, heterogeneity of variance was not confirmed.

The research questions focused on the main effects of expressiveness and organization. The third question dealt with distinguishing the effect sizes of these behaviors. In order to address these questions, Expressive Instruction (low, high) by Organized Instruction (low, high) 2 x 2 ANOVAs were conducted and the main effects were investigated. Assuming that significant main effects only indicate a difference among treatment means that cannot be attributed to error (Howell, 1987), each significant effect was followed up by a measure of the magnitude of the experimental effect using omega-squared (ω^2; Hays, 1973; Tabachnik & Fidell, 1992). Although traditional research views values less than .030 (i.e., accounting for less than 3% of the variance) as too small to be practically significant, the exploratory nature of the present thesis provided reason to discuss them.

The combined effects of both teaching behaviors were also explored. Four types of teaching episodes were investigated: low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization. The

following specific comparisons were of interest. First, the low expressive/low organization condition was thought to reflect poor teaching and thus produce lower learning outcomes than the low expressiveness/high organization, the high expressiveness/low organization, or the high expressive/high organization conditions. Second, high expressiveness/high organization was expected to be optimal teaching and therefore, hypothesized to yield better learning outcomes than any of the other three teaching episodes. Finally, the other two teaching conditions, low expressive/high organization and high expressive/low organization, were postulated to reflect other teaching conditions, differing only in the quality of the teaching behaviors representing them.

Given that organization, in comparison to expressiveness, demonstrated a stronger correlation with student achievement (Feldman, 1989), the low expressiveness/high organization condition was anticipated to be more effective than high expressiveness/low organization. Given the explorative nature of this research question, the familywise alpha level was set at .15. Thus, one-tailed Bonferroni t tests with alpha set at .025 for each contrast (i.e., six comparisons) were used with a critical $t_B(286) = 2.665$. The dependent variables included measures of attention and achievement.

Manipulation Checks

Teaching Manipulations

Researchers have compiled persuasive evidence regarding the validity of student ratings (Centra, 1979; Cohen, 1987; Feldman, 1989; Marsh, 1984; McKeachie, 1979). Thus, in order to ensure that the teaching manipulations were effectively portraying the teaching behaviors of interest, students ($n = 294$) rated the teaching behaviors. Using a 5-point Likert-type scale (i.e., 1 = "poor"; 5 = "outstanding"), students rated the videotaped lectures on 14 low and 3 high inference teaching behaviors. The 14 low inference items denoting the three lecturing behaviors of interest were extracted from Murray's (1983; 1987) Teacher Behaviors Inventory. The three high-inference items were added because they represent the global items found in most instructor evaluation questionnaires. Principle factors extraction with varimax rotation was performed using SAS on these 17 items. Three factors were extracted: organization, expressiveness, and clarity. The factor loadings and eigenvalues (or variances explained) are displayed in Table 2. The largest amount of variance was accounted for by factors loading on organization, followed by expressiveness and clarity.

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Insert Table 2 about here

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The items loading under each factor were summed and the means computed (i.e., item score/number of items), thereby creating three mean scores, one for each teaching behavior: expressiveness, organization, and clarity (range, 1 = "poor"; 5 = "excellent"). Each of these measures was used as a dependent variable in order to test the effectiveness of the manipulations. An Expressive Instruction (low, high) x Organized Instruction (low, high) 2 x 2 ANOVA demonstrated two significant main effects. First, a significant Expressive Instruction main effect was demonstrated on the expressiveness factor, $F(1, 293) = 128.99$, $MS_e = 0.61$, $p < .0001$, $\omega^2 = 0.30$ ($M = 2.97$; $SD = .83$; $n = 156$ vs. $M = 1.94$; $SD = .72$; $n = 138$). Second, a significant Organized Instruction main effect was demonstrated on the organization factor, $F(1, 293) = 439.66$, $MS_e = 0.56$, $p < .0001$, $\omega^2 = 0.60$ ($M = 4.06$; $SD = .58$; $n = 147$ vs. $M = 2.24$; $SD = .90$; $n = 147$). Finally, no significant Expressive Instruction (low, high) x Organized Instruction (low, high) interaction was found on clarity, $F(1, 293) = 0.01$, $MS_e = 0.76$, $p = 0.98$, indicating that the teaching behavior clarity, was not significantly different for any of the four teaching conditions. Based on these results, it was concluded that the videotape manipulations were verified. In other words, the type of teaching condition that students were exposed to was consistent with the intended manipulation of the teaching

behaviors. Students exposed to low expressiveness rated the teaching episode as low in expressiveness. This was the case for all four teaching conditions.

However, the means for the effective condition for expressiveness and organization were quite different (M = 2.97 vs. M = 4.06). Also, organization demonstrated an effect size twice that of expressiveness (ω^2 = 0.60 vs. ω^2 = 0.30), suggesting that the difference between effective and ineffective teaching in the organization manipulations was twice as strong as that of the expressiveness manipulations. These experimental findings indirectly reflect Feldman's (1989) correlational findings. The organization rating association with student achievement was almost twice that of expressiveness (see Table 1).

Clarity means for each lecture episode were closely clustered (M = 3.48; M = 3.94; M = 3.80; M = 4.22) and within close proximity to Murray's ineffective instructors' clarity scores (M = 4.01). Based on these outcomes, clarity was thought to be consistent across teaching manipulations and to reflect ineffective. Thus, the extraneous effects associated with clarity were thought to be minimal impact on student learning outcomes.

Presentation Sequence

In order to ensure that the achievement outcomes were not due to the time of experimentation (i.e., Monday through to Friday), but rather, due to the teaching manipulations, each condition was run twice, once in week one and once in week two. Furthermore, each of the four experimental conditions was randomly assigned to one of each of the sessions, for each of two weeks. As illustrated in Table 3, this resulted in a Week (week one, week two) x Teaching Condition (low expressive/low organization, low expressive/high organization, high expressive/low organization, high expressive/high organization) 2 X 4 design. A 2 x 4 ANOVA produced no significant interaction, $F(3, 287) = 0.39$, $MS_e = 4.98$, $p = .76$ or Week main effect $F(1, 287) = 2.72$, $MS_e = 4.98$, $p = .10$, on achievement, suggesting that the presentation sequence was counterbalanced. Table 3 displays the means and standard deviations.

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Insert Table 3 about here

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Instruction Effects

In order to address the instruction effects, a control group participated in a similar experimental condition as the experimental group, with the exception of not viewing any teaching videotapes (see Figure 2). A one-way Group (control, experimental) ANOVA demonstrated that the control group (M = 8.35; SD = 3.82; n = 85) had a lower achievement score than all the experimental groups (M = 15.75; SD = 5.02; n = 295), $F(1, 378) = 158.42$, $MS_e = 22.88$, $p < .0001$, $\omega^2 = 0.29$. Thus, the teaching conditions had an impact on student learning as compared to the control condition.

Results

To examine Feldman's (1989) ordering of expressiveness and organization experimentally, attention and achievement differences and the associated omega-squared values were determined for each teaching behavior. Based on the initial hypothesis, both teaching behaviors should demonstrate main effects on student learning outcomes. However, based on Feldman's (1989) correlational findings, the effects associated with organization should be greater than those associated with expressiveness. Instructor Expressiveness (low, high) x Instructor Organization (low, high) 2 x 2 between subjects ANOVAs were performed on attention and achievement outcomes to determine the effects associated with each teaching behavior. According to the main effects presented in Table 4, high, as compared to low, organization yielded higher levels of attention, as defined by a self-report item and a recall test, and achievement, as denoted by a recognition test and perceived amount learned. Furthermore,

three of the four significant main effects demonstrated practical effects (i.e., $\omega^2 > .30$). Thus, organization has an impact on student learning.

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Insert Table 4 and 5 about here

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In order to investigate the symbiotic/antagonistic relationship hypothesized to exist among different teaching behaviors, attention differences and achievement differences were determined for each teaching condition. Six a priori comparisons were performed to determine the effectiveness of each teaching episode. As seen in Table 5, combinations of expressiveness and organization differentially influenced student learning. Below, the comparisons are reported for each of the dependent variables associated with attention and achievement.

Attention

Two different indicators of attention, self-reported attention and a recall test, were used to measure the effectiveness of the teaching conditions. As predicted, the low expressive/low organization teaching condition had less of an impact on students' recall test scores than the high expressive/high organization teaching condition. Also, the high expressive/low organization teaching condition produced lower recall scores than either the low expressive/low organization or the high expressive/high organization teaching conditions.

Lecture achievement

Achievement measures, recognition, application, and perceptions of amount learned, were analyzed in order to assess the effectiveness of each teaching condition on measures of student learning. According to Table 5, the high expressive/high organization teaching condition yielded better recognition scores and perceptions of amount learned than either the low expressiveness/low organization or high expressive/low organization teaching conditions. Also, the low expressiveness/high organization teaching condition produced greater recognition scores than either the low expressiveness/low organization or the high expressiveness/low organization teaching conditions.

In summary, Table 5 demonstrates a number of patterns. First, and consistently on a number of dependent variables, the low expressive/low organization teaching condition is less effective than the high expressive/high organization teaching condition (i.e., comparison A-D). Second, simple organization main effects were observed in both the low (i.e., A-B) and the high expressiveness teaching conditions (i.e., C-D). Third, no simple expressiveness main effects were demonstrated on either the low (i.e., A-C) or the high organization teaching conditions (i.e., B-D). Fourth, the low expressive/high organization teaching condition was more effective than the high expressive/low organization teaching condition (i.e., B-C). As initially predicted, low expressiveness/low organization and high expressiveness/low organization are both ineffective teaching conditions, whereas low expressiveness/high organization and high expressiveness/high organization are both effective teaching conditions. These results extend the Manitoba studies in that attention and perceptions of achievement are also influenced by effective teaching.

Discussion

The present findings support Feldman's (1989) ordering of expressiveness and organization. Among a list of effective teaching behaviors, organization shows a higher correlation ($r = 0.57$) to student achievement than any other teaching behavior (Feldman, 1989). In the present study, organization, in comparison to expressiveness, causally impacts student attention and achievement outcomes (i.e., $\omega^2 > .030$). First, organization influences students' perceived (i.e., self-reported) and actual (i.e., recall) attention. According to cognitive theorists, selective attention is crucial for information processing (Meyer, 1975, 1977). Well-organized, as compared to highly expressive, presentations may provide the necessary structure for processing information. Moreover, the amount of effort required for processing relevant stimuli may be reduced and thus result in better attention outcomes.

Processing relevant stimuli from poorly organized lectures, on the other hand, may require greater allocation of cognitive resources. In so far as greater effort is required for disorganized presentations, students may be more easily distracted by irrelevant stimuli, experience loss of control of their learning environment, and therefore, do more poorly on measures of attention.

Second, organized teaching impacts students' perceived (i.e., self-reported) and actual (i.e., recognition) achievement outcomes. According to Jacoby (1983), a direct association exists between selective attention and learning, such that higher levels of attending produce better learning outcomes. Thus, students with higher levels of attention demonstrate higher perceived and actual achievement outcomes.

Third, organized teaching influences lower levels of information processing. According to Bloom's taxonomy (1956), achievement tests represent different levels of in-depth information processing. Recognition involves the correct identification of content from a large array of content with cues, whereas application requires the ability to use the general principles presented during the lecture in new or novel situations. Only lower level processing, such as recognition, and not the deeper or more critical thinking tasks, such as application, are impacted by organization. On intuitive grounds, this finding is expected. Unlike the real classroom, students did not have a chance to practice, review, or attempt to apply the material during or outside the classroom analog. Rather, students received a "one-time" only presentation of the stimulus material. As a result, differences in application are not found. Thus, organization causally impacts students' actual and perceived attention and achievement outcomes.

Organization Effects Explained

Three interpretations attempt to explain the influence of organization: the frustration hypothesis, the specific versus general orienting stimulus hypothesis, and the control hypothesis. According to the frustration hypothesis, exposure to communication that is not organized, but rather chaotic, may result in listener or audience frustration. For instance, students listening to an unorganized lecture may be very perplexed in trying to derive meaning from it. In an attempt to gain understanding, they may resort to skills of organizing the presented material. But this behavior may persist for only a short duration, yielding to the distraction of environmental stimuli. In other words, frustrated by the disorganized instruction and distracted by classroom stimuli, these students do poorly, scholastically. Presented with organized lectures, on the other hand, students are possibly provided with more cognitive structure and are thus more likely to focus on relevant stimulus material. The use of transitions in teaching, in turn, helps students organize the material, thereby enabling them to process relevant stimulus material (Land, 1979). Thus, well-organized teaching is crucial for student learning.

Alternatively, the specific/general orienting stimulus hypothesis suggests that a more specific, as compared to general, orienting stimulus, may be responsible for the effectiveness of organization. For instance, organization can be thought of as a specific orienting stimulus, directing students' attention to specific stimuli. Expressiveness, on the other hand, is more of a general orienting stimulus, encouraging students to pay attention to all stimuli. Each, then, would be necessary in captivating students' attention. However, enhancing attention to specific, as compared to all stimulus material, may be more advantageous for learning. In other words, helping students to focus on specific elements of the presentation, rather than the entire presentation, would seem more conducive for information processing. Thus, as a specific orienting stimulus, organization may have more of an impact on student learning, as compared to the more general orienting stimulus, expressiveness.

Third, the effectiveness of organization can be viewed in terms of increasing students' control. In other words, lectures presented in logical and organized chunks enhance students' processing of information, which, in turn, may enhance their feelings of control in the learning environment. Organized lectures, which provide clear outlines of the lecture presentation, may

instill in the student thoughts such as "I know where we are going, even if the teacher is boring". Thus, "teaching that helps students find a framework within which to fit new facts [i.e., lecture organization] is likely to be more effective than teaching that simply communicates masses of material in which the student can see no organization" (McKeachie, 1986, p. 229).

Disorganized teaching, on the other-hand, makes information processing difficult. The inability to process information may translate into feelings of loss of control over the learning environment. Loss of control, in turn, produces cognitive deficits, such as poorer scholastic outcomes (Perry, 1991). Thus, the impact of organization may work on the principle of influencing students' perception of control.

Expressiveness Effects Explained

In contrast, expressiveness results were not demonstrated as in previous studies (Coats & Smidchens, 1966; Feldman, 1989; Perry, 1991; McKeachie et al., 1986; Ware & Williams, 1975). The following arguments may account for this finding. First, the threshold at which expressiveness impacts student learning may not have been achieved. Accordingly, both student ratings and achievement should have been affected (Abrami et al., 1982; Feldman, 1989). In the present study, only student ratings reveal that high, as compared to low, expressive manipulation is an effective teaching behavior. However, the correlation between student achievement and student ratings of expressiveness was not statistically significant ($r = .051$, $p = .40$; vs. organization $r = .224$, $p < .0001$). According to Feldman (1994), the associations found between student achievement and lecture ratings of expressiveness are at best small or even modest (i.e., $r = .35$), occurring with larger sample sizes. The fact that the correlation is not demonstrated presently may indicate that the sample size was not large enough to boost the correlational index.

Second, a comparison between the effect sizes indicates an anomaly. Organization revealed an effect size ($\omega^2 = 0.60$) twice that of expressiveness ($\omega^2 = 0.30$). Based on this difference, organization may have had an advantage over expressiveness in impacting students' learning. But according to Feldman's (1989) correlational ordering, organization, in comparison to expressiveness, was expected to have a stronger effect on achievement outcomes.

Third, it is unclear whether or not previous studies controlled for other teaching behaviors during the expressiveness manipulation (with the exception of lecture content; Perry, 1991). Based on this premise, teaching behaviors such as organization and clarity may have been inadvertently manipulated. Thus, direct comparison of expressiveness ratings are difficult. Future research should have students rate the manipulation to ensure that the teaching behavior of interest is the only one being manipulated as perceived by students. Thus, a number of reasons may account for the lack of expressiveness findings on student attention and achievement outcomes.

The Symbiotic/Antagonistic Relationship Between Teaching Behaviors

The results of the four teaching conditions demonstrated that combinations of effective and ineffective teaching behaviors differentially influence student attention and achievement. The low expressiveness/high organization and high expressiveness/high organization teaching conditions were significantly superior to the low expressiveness/low organization and high expressiveness/low organization teaching conditions. The most parsimonious and reasonable explanation for these differences in teaching conditions suggests the following. First, both expressiveness and organization are important in impacting students' learning, however for different reasons. In the Manitoba studies, expressiveness is important for student achievement, whereas in the present study, organization is specifically crucial for enhancing student recall and recognition. Second, they operate at different levels. According to Feldman's (1989) meta-analyses, organization tends to have the largest correlation with student learning, followed by other teaching behaviors, including expressiveness. The present study

extends Feldman's correlational findings, demonstrating that organization, in comparison to expressiveness, has a large impact on student attention and achievement.

Third, and most significant to the present study, is the symbiotic/antagonistic relationship hypothesized to exist among combinations of teaching behaviors. In other words, different combinations of effective and ineffective teaching behaviors, have a different influence on student learning. First, they may complement each other and in turn, facilitate or enhance learning. For instance, the impact of high expressive/high organization yields significantly higher recall, recognition and perceptions of amount learned as compared to either low expressiveness/low organization or high expressive/low organization. Based on these findings, the combined influence of high levels of effective instruction, such as high expressiveness and high organization, compliment each other to produce higher levels of scholastic and related outcomes.

Second, the facilitative effects of one teaching behavior may be eliminated by the distracting characteristics of another, the antagonistic relationship. For example, students provided with the high expressiveness/low organization combination faired no better than students receiving low expressiveness/low organization. Based on these findings, poorly organized lectures may distract from or be antagonistic towards the facilitative effects of high expressiveness found in previous studies (Perry, 1991). Third, the facilitative effects of some teaching behaviors may not be influenced by the distracting effects of others. For instance, the low expressiveness/high organization combination did not thwart student learning, but rather, produced similar scholastic outcomes as the high expressiveness/high organization condition. In other words, low expressiveness, which has been demonstrated to thwart student learning (Perry, 1991), has virtually no impact on reducing the facilitative effects associated with high organization. Thus, both teaching behaviors are important for student learning, albeit for different reasons. Depending on the combination of teaching behaviors, student learning can be either facilitated or thwarted.

Summary

In essence, major advances in the understanding of the characteristics of effective instruction and student learning are addressed. Combining the results of the present thesis implies that certain teaching behaviors are effective because they have a universal effect on all students. For instance, organized teaching demonstrates consistent differences in student attention and achievement. In order to better understand the latter, more research is required.

Research Implications

Of greatest interest would be those conditions in which the teaching behaviors complement each other (i.e., symbiotic) to produce optimal learning conditions or compensatory effects (Perry, 1991) and those conditions in which they interfere (i.e., antagonistic) with each other to create less than optimal conditions. In the present study, the high expressiveness/high organization and low expressiveness/high organization teaching conditions demonstrate the former, whereas the high expressiveness/low organization and low expressiveness/low organization exemplify the latter. However, more research is needed to explain why these teaching behavior combinations are symbiotic or antagonistic toward each other.

Moreover, a number of other research issues have been generated by the present study. First, future research should investigate the specific information processing activities and learning behaviors associated with the specific attributes of expressive and organized instruction. According to Perry (1991), Murray (1991), and Schonwetter (1993), a number of links have been hypothesized (see Figure 1). These links require more empirical investigation in order to provide further rationale as to why these behaviors have such an impact on student learning. Research should focus specifically on how each of the attributes of these teaching behaviors influence student learning. Also, research needs to identify the specific cognitive processes that lead to the observed differences in student outcomes.

Second, field studies are needed. The present thesis represents learning only in the classroom analog, an environment created to simulate the actual college classroom. Furthermore, students were exposed to a "one-time" lecture episode without the chance of studying for the test. Exposure to a one 30-minute effective lecture episode may not be enough to enhance the learning experience of students with less adaptive learning orientations. A better measure of the lecture manipulations would be to provide students with consistent lecture behaviors over the duration of a course.

Also, a real classroom may provide students with the incentives to learn the material and thus increase the ego-involvement of students. Research attention should also be directed to other teaching behaviors that denote the lecture method and other teaching methods, such as group discussions, personalized instruction, seminars, and media (Dunkin & Barnes, 1986). By doing so, other teaching behaviors may be discovered that increase attention to task-relevant cues, enhance student learning, strengthen perceptions of control and motivate students to learn.

Finally, future research may rely on the complete variation of all independent variables instead of dichotomizing or trichotomizing variables as done traditionally (Perry, 1991) and in the present study. By applying continuous variables to regression analysis, a clearer picture may emerge regarding the teaching-learning phenomenon. For instance, structural equation modeling (Schonwetter, Clifton, & Perry, 1994) reveals that expressiveness is directly related to students' perceptions of amount learned, whereas organization is directly related to actual achievement outcomes. Students' perceptions of success are found to have a direct impact on their perceived and actual achievement outcomes, their affect, and motivation.

Educational Implications

Students seeking potentially effective instructors and administrators searching for potentially facilitative teaching should not only focus on elocutionary skills, but also on organization skills. Instructors concerned with the scholastic welfare of their students should focus on refining their organizational teaching skills. Also, rewards should be provided for instructors modeling effective teaching through high levels of organized lecture presentations. Attributes to be valued or rewarded should include: the instructor plans the activities of each class period in great detail, gives preliminary overview of lecture, puts outline of lecture on board, uses headings and subheadings, and signals transitions to a new topic (Feldman, 1989; Murray, 1991). Finally, workshops, seminars, and conferences on improving teaching through organizational teaching skills, should be made available for instructors who wish to enhance their teaching skills.

Finally, readers are cautioned when applying these results directly to the college classroom for the following reasons. First, learning occurred in a simulated, not actual college classroom. Second, students were exposed to a "one-time" lecture episode, and tested immediately without the chance of studying for the test or seeking additional help or resources. Third, video-taped lectures, as compared to live teaching, were used to present the stimulus material. Finally, novel lecture material was presented in order to control for any extraneous variables influencing student learning, such as previous knowledge. Thus, the limitations of the study would suggest that the results be used with caution.

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Table 1

Correlations Between the Instructional Dimensions of Effective Teaching and Student Achievement

Instructional Dimension	Correlation with Student Achievement
1. Organization	.57
2. Clarity & Understandableness	.56
3. Perceived Outcome or Impact of Instruction	.46
4. Stimulation of Interest in the Course and Its Subject Matter	.38
5. Encouragement of Questions & Discussion, & Openness to Opinions of Others	.36
6. Availability & Helpfulness	.36
7. Elocutionary (Expressiveness) Skills	.35
8. Clarity of Course Objectives & Requirements	.35
9. Knowledge of Subject	.35
10. Sensitivity to & Concern with, Class Level & Progress	.30
11. Enthusiasm for Subject or Teaching	.27
12. Instructor Fairness	.26
13. Intellectual Challenge	.25
14. Respect For Students	.23
15. Feedback to Students	.23
16. Course Material	.17
17. Supplementary Materials & Teaching Aids	.11

Note. Table adapted from Feldman (1989).

Table 2

Factor Loadings of Student Ratings of Effective Teaching

Low Inference Teaching Behaviors	Factor 1	Factor 2	Factor 3
Used outline	0.87660		
Used preliminary overview	0.87655		
Headings & subheadings	0.84053		
Signaled transitions	0.71878		
Wrote key terms on overhead	0.69368		
Was organized*	0.59380		
Facilitated note-taking	0.58652		
Used multiple examples			0.68598
Used concrete examples			0.68499
Repeated difficult terms			0.55899
Was clear*			0.47451
Gestured with hands & arms		0.80115	
Moved while lecturing		0.78039	
Varied speech & tone of voice		0.62970	
Made eye contact		0.62289	
Enhanced presentation with humor		0.58975	
Was expressive*		0.56393	
Eigenvalues	***4.9732***	***2.9356***	***2.1208***

Note. High inference items = *. All other items represent low inference items. Factor 1 represents organization; Factor 2 represents expressiveness; Factor 3 represents clarity.

Table 3

Achievement Outcome Means and Standard Deviations of the Effective Teaching Manipulations by Time of Week

Time	Low Expressive		High Expressive		Week Means
	Low Organization	High Organization	Low Organization	High Organization	
Week One					
M	14.23	16.39	13.84	16.54	15.36
SD	4.44	4.26	5.15	5.71	5.09
n	26	36	37	41	140
*Presentation Day**	*day 4*	*day 1*	*day 2*	*day 3*	
Week Two					
M	15.95	17.21	15.17	16.55	16.15
SD	4.69	5.50	4.66	4.83	4.94
n	38	39	47	31	155
*Presentation Day**	*day 1*	*day 3*	*day 2*	*day 4*	

Note. * = conditions were randomly assigned to one of four days for each of two consecutive weeks.

Table 4

Expressiveness (low, high) By Organization (low, high) 2 x 2 ANOVA's Summary Table: Main Effects

Variable Category	DV's	IV's	Statistical Summaries	ω^2
Attention	Self-Reported Attention	exp	$F(1, 271) = 0.27$, $MS_e = 4.10$, $p = .61$	
		org	$F(1, 271) = 9.52$, $MS_e = 4.10$, $p < .005$	0.020
	Recall	exp	$F(1, 271) = 0.73$, $MS_e = 13.87$, $p = .39$	
		org	$F(1, 271) = 19.91$, $MS_e = 13.87$, $p < .0001$	0.052*
Achievement Performance	Recognition	exp	$F(1, 271) = 0.02$, $MS_e = 3.59$, $p = .88$	
		org	$F(1, 271) = 19.11$, $MS_e = 3.59$, $p < .0001$	0.051*
	Application	exp	$F(1, 271) = 0.02$, $MS_e = 12.17$, $p = .89$	
		org	$F(1, 271) = 2.79$, $MS_e = 12.17$, $p = .15$	
	Perceived Learning	exp	$F(1, 270) = 1.02$, $MS_e = 5.07$, $p = .31$	
		org	$F(1, 270) = 17.88$, $MS_e = 5.07$, $p < .0001$	0.045*

Note. * = practically significant ($\omega^2 > 0.03$); exp = expressiveness; org = organization.

Table 5

Means and Standard Deviations for Student Attention and Achievement Measures

	LOW EXPRESSIVE		HIGH EXPRESSIVE		BONFERRONI t tests (t = 2.67)					
	LOW ORGANIZATION (A)	HIGH ORGANIZATION (B)	LOW ORGANIZATION (C)	HIGH ORGANIZATION (D)	A-B	A-C	A-D	B-C	B-D	C-D
Attention Indicators										
Self-Reported[1]										
MEAN	6.65	7.48	6.87	7.51						
STD	2.28	1.80	2.21	1.77	2.40	0.65	2.45	1.90	0.09	1.96
Recall[2]										
MEAN	11.09	12.27	10.82	13.39						
STD	3.72	4.16	3.28	4.01	1.83	0.43	3.53	2.41	1.79	4.22
Achievement Indicators										
Recognition[3]										
MEAN	5.48	6.57	5.37	6.42						
STD	1.80	1.90	1.91	1.96	3.38	0.35	2.85	3.98	0.51	3.41
Application[4]										
MEAN	9.77	10.24	9.21	10.13						
STD	3.34	3.51	3.57	3.85	0.77	0.94	0.59	1.81	0.19	1.60
Perceived Learned[5]										
MEAN	4.05	4.75	4.18	5.56						
STD	2.18	2.34	2.35	2.43	1.76	0.33	3.76	1.54	2.11	3.69
n	64	75	84	72						

Note. [1]"Expressed in terms of percentages, how would you describe your attention to the lecture" (i.e., 1 = 10%; 10 = 100%). [2]Five minute free recall of lecture key words (maximum of 42 lecture unit ideas). [3] Ten multiple choice recognition items based on lecture. [4]Twenty multiple choice application items based on lecture. [5] "How much did you learn from the lecture" (1 = "not at all"; 10 = "very much so"). Boxed numbers indicate statistically significant t tests.

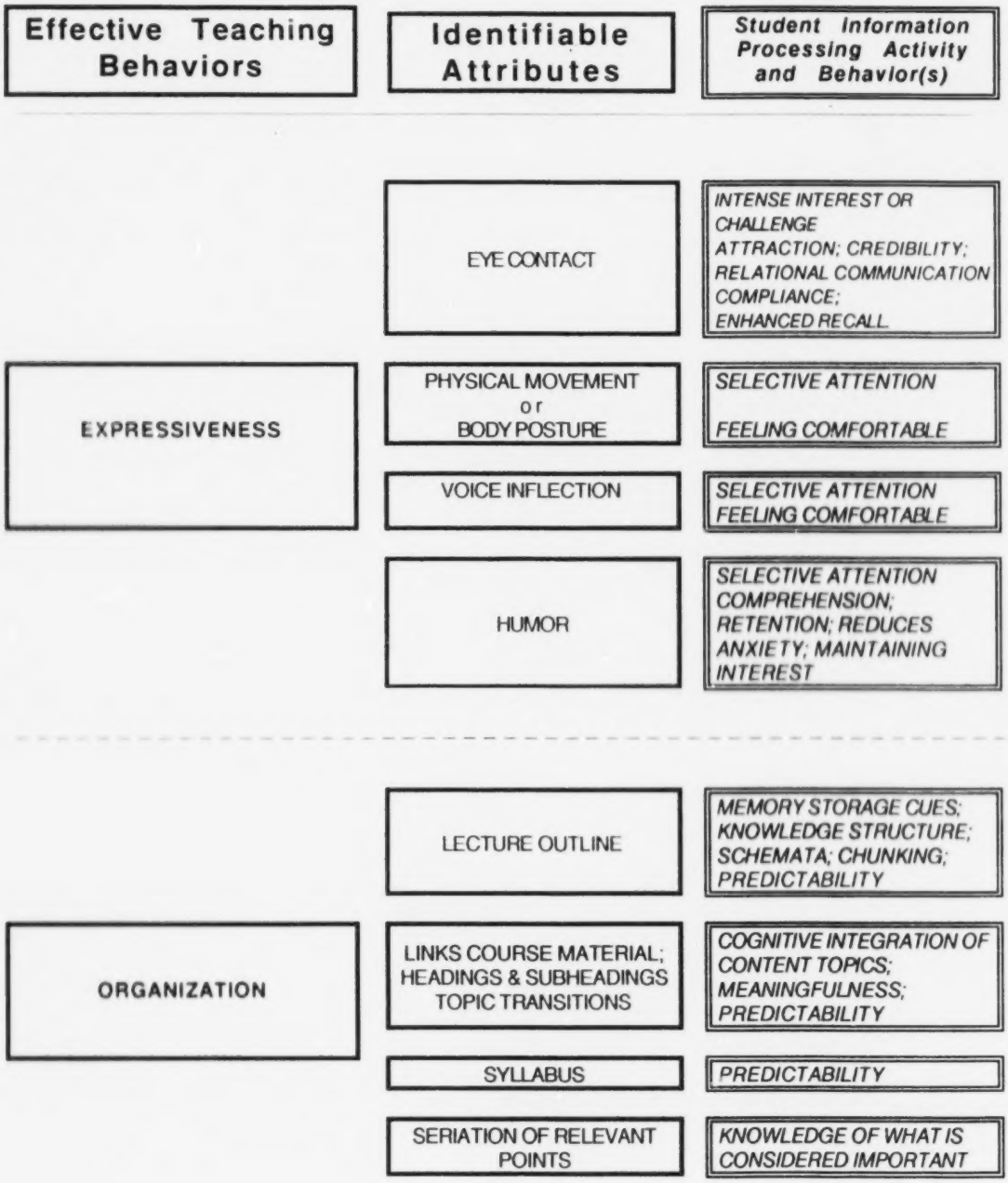

Figure 1. Effective teaching behaviors' influence on student learning and behavior (adapted from Perry, 1991).

Procedure

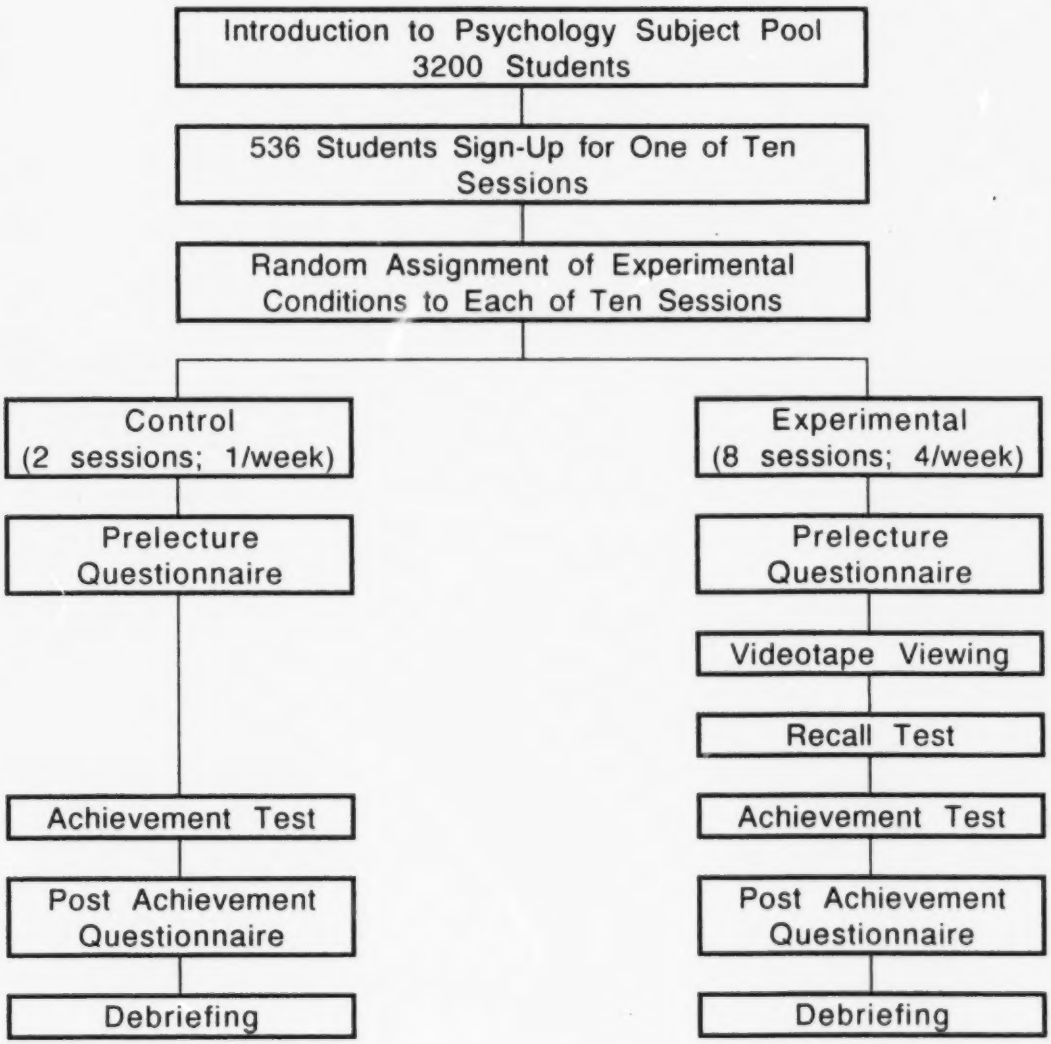

Figure 2. Experimental procedures of the control and experimental groups.

An Empirical Comparison of Two Effective College Teaching Behaviors: Expressiveness and Organization

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Abstract

The present study draws on existing theories and research to further uncover the mysteries of the teaching/learning paradigm. More specifically, the causal links between effective instruction and student learning of novel lecture material were examined. The experimental design involved 380 introductory psychology students and consisted of a Lecture Expressiveness (low, high) by Lecture Organization (low, high), 2 x 2 design. Four teaching conditions were defined by the following manipulations: low expressiveness/low organization, low expressiveness/high organization, high expressiveness/low organization, high expressiveness/high organization. The dependent variables included student attention and achievement. The results extend previous correlational research. For instance, organization showed consistent differences in student attention and achievement. These findings and their implications are discussed at length and suggestions are made for classroom instructors and college students to capitalize on organization as an effective teaching behavior.

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An Empirical Comparison of Two Effective College Teaching Behaviors: Expressiveness and Organization

Although recent research on college teaching has increased our knowledge of what behaviors constitute effective instruction (Cohen, 1987; Feldman, 1989; Marsh & Dunkin, 1992; Murray, 1991; Perry, 1991) and which student differences constitute adaptive learning orientations (McKeachie, Pintrich, Lin, & Smith, 1986, Perry & Dickens, 1984), there has been a notable lack of progress in understanding the contribution of effective teaching variables in learning conditions. Furthermore, much of the research in this area tends to be atheoretical, lacking suitable conceptual frameworks. Thus, the purpose of this study was to help clarify the teaching-learning process by investigating the links between effective teaching and student learning outcomes. This was accomplished by focusing specifically on how commonly recognized effective teaching behaviors, expressiveness and organization, compare and interact with each other. Below, each section defines the unique set of critical variables of interest, reviews empirical evidence supporting the phenomenon under consideration, provides a theoretical framework, and concludes by identifying the critical hypotheses to be empirically tested.

Effective Teaching Behaviors

Specific instructional methods comprise what is considered as teaching in the college classroom. These include lectures, group discussions, personalized instruction, seminars, and technology (Dunkin & Barnes, 1986). The lecture method was chosen in the present study to define teaching for three reasons. First, it is still the pervasive style of presenting knowledge in the college classroom (Dunkin & Barnes, 1986). For example, more than 70% of instructors reported lecturing as their principle teaching method (Educational Testing Service, 1979). Second, in contrast to most other teaching methods, the behaviors denoting the lecture method, such as expressiveness, organization, clarity, and lecture content, are more easily isolated and manipulated through videotape presentation (e.g., Abrami, Leventhal, & Perry, 1982). The videotape presentation, in turn, provides an ideal format for conducting experimental investigations, since specific teaching behaviors can be held constant, while others are systematically manipulated. Third, literature on the lecture method is more abundant than other teaching methods. For instance, the last twelve years (1982-1993) of the United States Educational Resource Information Center database (1994) revealed more single article citations for the lecture method (N = 2182), than for seminars (N = 1939), group discussions (N = 639), technology (N = 100), or personalized system of instruction (N = 96).

Research on teaching behaviors basically consists of two methodological approaches: observational and experimental. In observational studies, behaviors are observed and then correlations are drawn between teaching behaviors and student outcome measures. The experimental approach, on the other hand, manipulates one or more teaching behaviors while holding all other factors constant and determines the impact that these behaviors have on student learning outcomes. Rather than attempting an exhaustive review of the research to date, the next section will focus on the important studies that exemplify these research approaches.

Descriptive Studies

Field studies have demonstrated effective teaching behaviors over the past seven decades (McKeachie, 1990). Research was initially descriptive and unstructured, relying on students' spontaneous open-ended responses (Epstein, 1981; Hildebrand, Wilson, & Dienst, 1971; Uranowitz & Doyle, 1978). A myriad of descriptions defining effective teaching were revealed. Student responses were summarized and clustered into closely related dimensions, such as personal attributes and subject mastery (Sheffield, 1974). Based on these initial research findings, a number of evaluative ratings and observational questionnaires of effective teaching have been generated.

These instruments, in turn, have been completed by countless students (see Marsh, 1984) and have been subjected to factor-analysis and meta-analysis procedures in order to identify specific effective teaching behaviors. These procedures have found anywhere from 2 to 28 mathematically distinct behaviors (Cohen, 1981; Feldman, 1989; Frey, 1978; Hildebrand et al., 1971; Solomon, Rosenberg, & Bezdek, 1964). For instance, in a series of studies, Feldman (1984; 1989) expanded the range of teaching behaviors that Cohen (1981) had initially observed in his meta-analysis. Feldman's (1989) list of 28 categories provides the most comprehensive set of teaching behaviors to date.

These teaching behaviors have been subjected to correlational analyses and a number of them have been linked statistically with student achievement. For instance, Table 1 lists 17 teaching categories that Feldman (1989) found to correlate with student achievement. Although important in supporting the strength of the relationship between effective teaching and student achievement, and demonstrating the rank ordering of their strength, these correlations fail to demonstrate the critical causal linkages. According to Feldman (1994), it is still empirically unclear as to which behaviors "are more likely and which are less likely to produce achievement" (p. 21, italics underlined). The present thesis addresses this issue by examining the causal relationship and effect sizes between certain effective teaching behaviors and student learning outcomes.

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Insert Table 1 about Here

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Experimental Findings

Descriptive research findings present a consistent picture of the outstanding college teacher. A number of teaching behaviors are repeatedly reported. These reoccurrences have prompted further investigation of the different fundamental teaching dimensions through experimental studies. Of specific interest were expressiveness and organization. These behaviors were selected for the following reasons. First, both are significantly correlated with student achievement. Organization is listed first in Table 1, demonstrating the highest correlation, whereas expressiveness places seventh in a list of 17 teaching behaviors. Also, the correlation associated with organization, in comparison to expressiveness, is almost twice as large, suggesting a higher degree of association with student achievement. Second, both lend themselves to manipulation via videotape format. Third, lectures presented in large amphitheaters, a common occurrence in introductory and distance education, diminish the frequency for other teaching behaviors such as interaction, rapport, and feedback. For these reasons, expressiveness and organization were investigated. A detailed definition of expressiveness and organization, empirical evidence showing their influence on student achievement, and hypotheses regarding the links between each teaching behavior and learning outcomes are provided below.

Expressiveness. Experimental studies have consistently shown that expressive instruction is associated with student learning (Marsh, 1984; Perry, 1991). Low inference behaviors denoting expressiveness include "movement while presenting material", "gesturing with hands and arms", "eye contact with students", "voice inflection", "minimal reliance on lecture notes", and "humor that is relevant to lecture content" (Murray, 1991; Perry, 1991). Expressiveness predicts students' scholastic behaviors such as achievement (Coats & Smidchens, 1966; Mastin, 1963; Perry, 1991), attendance to a delayed lecture and amount of homework completed (Perry & Magnusson, 1987; Perry & Penner, 1990), and paying for additional lecture material (Slater, 1981; cited in Murray, 1991). Expressiveness has also been found to affect outcomes related to students' performance, such as generating a more internal attributional orientation toward achievement (i.e., ability/effort), and increasing positive affects (i.e., pride), self-confidence (i.e., self-competence), and motivation (Magnusson & Perry, 1989; Perry & Dickens, 1984; Perry, Magnusson, Parsonson, &

Dickens, 1986; Perry & Penner, 1990; Schonwetter, Perry, Menec, Struthers, & Hechter, 1993; Schonwetter, Perry, & Struthers, 1994). Thus, expressiveness is not only correlated with, but also causally linked to student achievement and achievement-related outcomes.

Researchers have taken a cognitive approach to explain the causal links between expressiveness and student learning (Murray, 1991, Perry, 1991). According to Figure 1, both physical movement and voice intonation are hypothesized to elicit students' selective attention. Visual and/or audible changes of stimuli in a learning environment tend to elicit student attention. Also, appropriate visual or audible changes associated with important lecture material are thought to provide students with learning cues as to what is considered important and to be learned. Finally, bodily posture and vocal inflection are postulated to make students feel comfortable in the learning environment (Furio, 1987). Thus, body movement and voice intonation may impact student learning.

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Insert Figure 1 about here

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The effects of eye contact or eye gaze vary in the research literature. For instance, differential eye contact behavior by an actor produced varied perceptions of attraction, credibility, and relational communication in a group of observers (Burgoon, Coker, & Coker, 1986). Also, eye contact by an instructor produced levels of compliance in students (Hamlet, Axelrod, & Kuerschner, 1984). Furthermore, students presented with eye contact, as compared to no eye contact during a verbal presentation, demonstrated higher recall scores of lecture material (Sherwood, 1987). A number of possible explanations have been provided for these outcomes. Perry (1991) for instance, views eye contact as creating intense interest or challenge of the recipient. Sherwood (1987) and Otteson and Otteson (1979) posit that it increases a sense of personal relationship or intimacy between the student and the speaker. Thus, eye contact appears to play an important role in teaching/learning dynamics.

As can be seen in Figure 1, humor is also posited to influence learning. For instance, it has been instrumental in improving comprehension, enhancing retention (Johnson, 1990), and increasing learning of substantive facts and awareness of attitudes regarding sensitive issues such as death and dying (Safford, 1991). Exposure to humor, as compared to no humor lectures, lowered students anxiety and improved their test performance (Bryant & Zillman, 1988; Ziv, 1988). Moreover, the effectiveness of humor has been directly related to the extent that it is relevant to the material taught and the items tested are related to it (Kaplan & Pascoe, 1977). Humor also promotes a positive and cohesive class environment (Civikly, 1986). Perceived as a valuable teaching skill, humor is thought as maintaining student interest and facilitating acquisition of information in a given topic area (Gentilhomme, 1992). Thus, humor is thought to be an effective component of classroom teaching.

Sometimes referred to as "enthusiasm", expressiveness is thought to be vicariously transferred to the student in the form of increased motivation, such as studying outside of instruction time (Murray, 1991). Students are influenced by environmental variables, such as energetic instructors, modeling the high energy or interest of content material presented. For instance, students who perceive their music instructor as exhibiting more, in comparison to less, expressiveness also enjoyed their music lesson more, reported more positive affects, had a greater desire to learn more, and demonstrated greater exploratory behavior (Cameron, Enzle, & Hawkins, 1992). Thus, a student's tendency to model interest in a given lecture topic may be influenced by the "enthusiasm" or expressiveness of an instructor.

Based on the above low inference behaviors, expressiveness is postulated to facilitate students' selective attention (Murray, 1983; Perry & Dickens, 1984; Williams & Ware, 1976). For instance, expressiveness is thought to provide general stimuli for optimum arousal through the stimulus cueing qualities associated with physical movement, voice intonation, eye

contact, and humor. As a general orienting stimulus, expressiveness indicates "pay attention", "this material is interesting and/or important," and enables students to process relevant information (Murray, 1991), thereby enhancing memory storage and retrieval (Perry, 1991). Selective attention, in turn, is crucial to most types of information processing (Kuhl, 1985; Mayer, 1987).

Stimulating and sustaining of students' interest in a stimulus item may dictate how much attention will be directed toward it. Anderson (1982) explains this phenomenon as follows. As learning occurs, incoming information is processed and evaluated for importance. The amount of attention focused on the stimuli is directly related to the importance of the stimuli. As more attention is directed toward the stimuli, the stimuli are better learned than other stimuli (Anderson, 1982). Accordingly, an instructor who presents interesting material may elevate the importance that students attribute to learning the material. In turn, the amount of selective attention directed toward the material may be enhanced.

Research on instructor expressiveness tends to reveal a number of shortcomings. First, investigation of students' selective attention generated by expressive instruction has been neglected. In response to this oversight, this phenomenon was explored in the present study. Students optimally aroused by expressive instruction were hypothesized to process information more efficiently. In other words, students exposed to expressive instruction should demonstrate higher levels of attending to lecture material.

Second, previous research has failed to control for the influence of other teaching behaviors while investigating expressiveness. For instance, most studies documented in Abrami et al.'s (1982) meta-analysis manipulated the levels of expressiveness and lecture content, but mention little about controlling for other teaching behaviors. Other behaviors, such as organization or clarity, were not recorded as having been controlled. Thus, the present thesis extended this research by controlling for teaching behaviors previously not controlled for.

Organization. Good organization of subject matter and planning of course content are important to student learning (Kallison, 1986). Examples include "the instructor planned the activities of each class period in great detail", "gives preliminary overview of lecture", "puts outline of lecture on board", "uses headings and subheadings", "signals transitions to a new topic", and the "seriation of relevant points" (Feldman, 1989; Murray, 1991). The latter is best described as the enumeration of elements in a series such as "first,...", "second,...", "third,...", and "finally,...". The organized instructor has a well-structured method of teaching which breaks the course into units more readily accessible for information processing (Perry, 1991).

Organization is postulated to provide specific cues for what is to be attended to. This is accomplished through the organization of course material, as seen through well-structured presentations, syllabi, lecture outlines, and seriation of relevant points, headings, and subheadings (see Figure 1). Lecture material presented in the aforementioned ways has a higher probability of being recorded, a factor which, in turn, significantly improves achievement (Hartley & Cameron, 1967; Hartley & Fuller, 1971; Maddox & Hoole, 1975). Intact outlines may serve to guide note-taking, depicting the organization of the main ideas of a presentation. The use of embedded headings and intact outlines with videotaped instruction optimizes both immediate and delayed learning (Frank, Garlinger, & Kiewra, 1989).

In addition to being a specific stimulus cue, organization in the form of outlines represents a knowledge structure, serving as an advance organizer (Glynn & Di Vesta, 1977) and providing students with "chunking" strategies (Perry, 1991). Chunking refers to the process whereby distinct pieces of information are grouped together in order to enhance

memory (Perry, 1991). This knowledge structure represents a set of related categories about the nature of and the relationships between the ideas presented (Rumelhart & Ortony, 1977). As such, it enhances students' integration of content topics by providing a "chunking" strategy for linking new to preexisting knowledge. In other words, it provides a quick and logical method of structuring lecture material (Perry, 1991), which influences comprehension (Meyer, 1975; 1977) and facilitates encoding and retrieval of learning material (Glynn & Di Vesta, 1977). For instance, when the information was organized during learning, students showed better memory of information (Katona, 1940). Also, highly structured teaching has produced significantly better student achievement than less structured teaching (Guetzkow, Kelley, & McKeachie, 1954).

Overall, expressiveness and organization appear to influence student learning, specifically affecting their attention. However, as orienting stimuli, these teaching behaviors may differentially impact students' attentional processes. Expressiveness is assumed to be a general orienting stimulus related to general information processing. For instance, with low expressive instruction, students may perceive lecture material as irrelevant and thus, not attend to it. However, with an increase in expressive behavior, such as the presentation of humor, body movement, etc., students' attention will continue to be engaged as long as expressiveness remains at a high level. Any lecture material presented during this time and for a short time following should be perceived as important and attended to. In other words, the student may listen more intently as if the dynamics of the teaching behavior denote something relevant and worth attending to. Therefore, most learning that occurs under expressive instruction is assumed to occur as a function of associating the dynamic elements of expressiveness (i.e., voice variations) with the presentation of the lecture material. Thus, high expressiveness is hypothesized to act as a general stimulus cue, indicating that the material being presented is relevant.

Organization, on the other hand, is thought to elicit attention to specific lecture material cued by outlines, headings, and seriation of relevant points. These cues tend to be directly linked to what is regarded as important. For instance, a lecture outline provides the student with the relevant stimuli to be learned. Also, the seriation of relevant points not only specifies what is important, but may also dictate the order of importance. Thus, a direct link is thought to exist between organization and the relevant stimuli to be learned. Based on this premise, organization is viewed as a specific orienting stimulus, directing attention to specific lecture material.

In summary, high expressive and high organized instruction should produce an optimal learning environment when all other factors are held constant. The absence of these teaching behaviors, on the other hand, should result in a related information processing deficit, reducing the amount of learning possible. Although Feldman (1989) has demonstrated organization to be more highly correlated with student achievement than expressiveness, a comparison of these two teaching behaviors has yet to be conducted experimentally. Thus, of critical concern to the present thesis is the influence that each of these teaching behaviors has on student learning outcomes.

The Present Study

The first purpose of this study was to examine the relationship between two teaching behaviors and their influence on student learning outcomes. Specifically, two research objectives were addressed. First, Feldman's (1989) ordering of expressiveness and organization was determined experimentally. According to Feldman, organization is more highly correlated with student achievement (r = .57) than expressiveness (r = .35). However, each behavior was hypothesized to have some influence on student learning. The magnitude of the teaching behaviors' main effects, omega-squared values, were compared in order to address this objective.

Second, the combined effects of instructor expressiveness and instructor organization were investigated. It was hypothesized that a symbiotic/antagonistic relationship exists among different teaching behaviors, such that certain behavior combinations are complementary, facilitating student learning (i.e., symbiotic), whereas others are distracting, thwarting student learning (i.e., antagonistic). In order to explore this idea, four teaching conditions were developed: low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization. Although low expressiveness/low organization and high expressiveness/high organization were thought to reflect poor and excellent teaching, respectively, the other two conditions, low expressive/high organization and high expressive/low organization, were thought to represent more typical teaching, differing only in the quality of each of the two teaching behaviors. Based on Feldman's (1989) correlational findings, the low expressiveness/high organization condition was thought to be more influential than the high expressiveness/low organization condition. Thus, six a priori comparisons were conducted to address this issue.

Instructor expressiveness (low, high) and instructor organization (low, high), represented the independent variables, whereas student attention and achievement behavior were the dependent variables. Attention was defined by a recall test of the lecture material and self-reported lecture attending. Achievement was denoted by a recognition and an application test of the lecture material, and by a self-report perception of learning. In order to control for extraneous learning variables, such as student seeking help, researching topics in a library, reading from a text, asking the instructor, students were exposed to a one-time instructional episode and presented with novel lecture material.

Method

Subjects

The subjects were 380 introductory psychology students who volunteered for one of 10 two-hour time slots in order to fulfill their course requirements: 85 in the control group (39 males; 46 females; ages: 18 - 45; M = 22.22 SD = 6.39) and 295 in the experimental groups (males = 118; females = 177; ages: 18 - 45; M = 20.87; SD = 4.65).

Materials

Instructional manipulation. Given their effect on student achievement in the college classroom, expressiveness and organization were selected to represent teaching (Feldman, 1989; Murray, 1991; Perry, 1991). Lecture content was held constant by equating the lectures for the number of teaching idea units. This was accomplished by having the instructor use the identical set of lecture notes for all presentations. In order to test the hypotheses, four color videotapes were developed: low expressiveness/low organization; low expressiveness/high organization; high expressiveness/low organization; and high expressiveness/high organization. In each of the videotapes, a female economics professor who had won a number of teaching awards gave a lecture on the topic of "demand", a lecture typically presented to first year economics students.

The videotape presentations varied according to expressiveness defined in terms of eye contact with the videotape-camera, voice inflection in the delivery of the presentation, physical movement depicted by appropriate hand gestures, physical relocation of the presenter around the lectern, and humor reflecting lecture-content material. The organization manipulation included variation of the following behaviors: giving a preliminary overview of the lecture, providing an outline of lecture on the overhead, using headings and subheadings, and signaling transitions to a new topic. These characteristics were decreased and increased in the low and high conditions, respectively.

An Electrohome Color Videotape Projection Unit projected the videotapes onto a 2.2 meter diagonal screen in order to simulate a life-size presentation. Furthermore, the videotape-camera focused on the lecturer at all times during the initial recording session, with the exception of an occasional view of the overhead material. Projection of this format of videotape recording onto a flat screen produces the illusion that the instructor is at all times facing the audience, regardless of the angle of vision that each student's seat represented. In order to enhance the visual effect, students were seated facing the screen within 50 degrees on either side of the perpendicular from the screen. This was done in order to reproduce as close to "life" representation of the lecturer as possible.

Taped lectures rather than "live" presentations were selected for a number of reasons. First, in order to investigate the causal nature of specific teaching behaviors, it was necessary to control for lecture content and presentation variables across all conditions, a task that is easily accomplished through videotaping. Second, comparable effectiveness in demonstrating teaching effects in college classrooms has been maintained through the use of videotapes (Abrami et al., 1982; Perry, 1991; Perry, Abrami, & Leventhal, 1979). Third, videotaped instruction serves as an effective alternative to conventional instruction (Jamison, Suppes, & Wells, 1974).

Finally, training a confederate to provide multiple, yet consistent teaching behaviors in the classroom laboratory would be difficult for a number of reasons. First, due to practice effects, there is a high probability that the last lecture presented will be the best or the worst. Second, fatigue may influence an instructor's presentation, especially when having to present two sets of four teaching episodes. Third, "live" teaching would not permit the control of other teaching behaviors such as interaction, rapport, and lecture content, thereby confounding the effects of the teaching behaviors of interest. Fourth, videotaped lectures also control for teacher biases that are present in "live" teaching situations. Given the consistent teaching behaviors over multiple presentations, the reduction of possible practice effects as well as the control of experimenter bias, the videotape format was chosen.

Classroom analog. The simulated college classroom setting was intended to provide a realistic environment in which to study effective instruction and student differences on student learning outcomes. Behavioral, affective, and cognitive involvement is generally quite high. According to Perry (1991), participants are often highly motivated to provide explanations for the outcome of the achievement event in a classroom analog. Furthermore, investigating instructor characteristics in the laboratory setting is thought to "lead to more precise descriptions of effective teaching behaviors" (p. 461-462; Abrami et al., 1982).

Selective attention. Studies investigating the teaching-learning phenomenon have indirectly inferred student attention from cognitive deficits. For instance, in a summary of the Manitoba Laboratory studies, Perry (1991) stated that "expressive teaching did not enhance learning and performance in helpless students, suggesting that selective attention may have been impaired" (p. 37). However, these studies provided no direct evidence supporting the link between effective instruction and student attention. Based on the difficulty of measuring student attention during learning, these studies relied on the consequences of attention, namely achievement tests.

However, presuming student attention from achievement performance has its limitations. For instance, the achievement measure used in these studies relied on the multiple choice format (Perry & Dickens, 1984; 1987; Perry & Magnusson, 1987; Perry et al., 1986; Schonwetter et al., 1994b). Multiple choice format tests provide cues which enhance students' memory of information processed during the lecture presentation. To define selective attention on the basis of recognition scores is problematic in that student scores may not only be the result of selective attending during lecture presentation, but also the result of cues provided by

the test. In order to address this issue, the present study administered a recall test based on the following reasons. First, a recall test does not provide stimulus cues. Students are given a piece of paper that contains no words related to the lecture and are required to write down all the lecture unit ideas presented. Second, recall has not been used before as a measure of effective teaching and given that it does not provide lecture presentation cues, it can be a better measure of learning than recognition. Although not a direct measure of attention, recall may give greater confidence in concluding that attention is affected. Furthermore, previous research on effective teaching and student learning has not considered self-report measures of student attending to lecture presentation. In the present study, the administration of student lecture attention self-report was hypothesized to provide an alternative method of denoting selective attention.

Thus, selective attention was denoted by a recall test and a self-report item. During the five-minute recall test, students were not provided with any lecture cues, but rather, with a blank sheet of paper on which to record as many of the key words presented during the lecture (i.e., demand, complements, services, goods, etc.). Of the possible 42 lecture unit ideas consistently presented across all four teaching episodes, students scored well below the median (Md = 21; M = 11.87; SD = 3.91; range = 4 - 23). On a single-item, ten-point scale, students identified the extent to which they attended to the lecture (i.e., 1 = "0%"; 10 = "100%"). One student scored 0 on the recall test, representing an outlier (i.e., z = 3.0) and was therefore removed from further analyses.

Lecture achievement test. Most studies have relied almost exclusively on student final examinations as outcome measures (see Murray, 1991). According to McKeachie et al. (1986), final examinations can be poor criteria for differentiating the effects of teaching since they are based primarily on textbook material and therefore poor indicators of learning derived solely from the lecture presentation. Moreover, students may try to compensate for ineffective teaching by additional research or getting help from peers, thereby confounding any teaching effect. In order to avoid this problem, an empirical investigation of teaching behaviors in a controlled environment was conducted where the criteria for learning was the amount of information learned from novel lecture material and not from external sources such as textbooks or peers. Students were exposed to a "one-time" lecture presentation and were then required to write the achievement test.

Furthermore, past studies relying on achievement tests have almost exclusively depended on recognition tests consisting of multiple-choice items (i.e., Perry & Dickens, 1987, Perry & Magnusson, 1987; 1989; Perry & Penner, 1990; Schonwetter et al., 1994b). Although recognition is a measure of student learning, it only represents one dimension of student thinking: knowledge (Bloom, 1956). It involves the correct identification of content from a large array of content with cues. Recognition tests do not force recall, the remembering of content without any cues and therefore, may represent a lower or less in-depth processing of information. A more involved or deeper level of learning is the application of knowledge. This requires the ability to use general principles or ideas presented during the lecture and to apply them to new or novel situations. Compared to previous studies, the present study incorporated recognition and application items to create a more comprehensive definition of learning.

In order to ensure that the material presented was novel, students were screened regarding their experience with the lecture material. Few studies have sought to control students' prior knowledge of content material presented in the lecture manipulation. Two methods were utilized to address this issue here. First, introductory psychology students were exposed to lecture content not directly related to their discipline--an economics lecture. Second, in order to control for prior knowledge effects, students who self-reported economics experience were deleted from the initial sample, i.e., "Have you ever had this material

before?": "Yes" or "No". Obviously, this presents certain limitations for the generalizability of the results.

The achievement test derived from the *lecture* was composed of 30 multiple-choice items, each item having four choices. Ten items represented recognition, whereas the other items measured knowledge application. The multiple-choice test was designed to be moderately difficult in order to avoid a ceiling affect (M = 15.77; SD = 5.02; range = 4 - 29). Students perceived the test as difficult. For instance, on a 10-point scale (i.e., 1 = "no influence on my performance"; 10 = " a great deal of influence on my performance"), they attributed test difficulty as having an influence on their performance (M = 6.37; SD = 2.33). One student scored 0 on the recognition and application tests, representing an outlier (i.e., z = 3.1) and was removed from further analyses. Given that perceived versus actual learning may be linked to students' cognition, affect, and motivation (Weiner, 1986), students rated the amount that they perceived they had learned (i.e., 1 = "very little"; 10 = "very much").

Procedure

As seen in Figure 2, approximately 3200 students in a multisection introductory psychology course volunteered for one of five sessions in either Week 1 or Week 2. In order to counterbalance the sequence in which each condition was presented during each week, the four experimental conditions and one control condition were randomly assigned to each of the sessions, once in each week. Students in groups of 40-50 came to the simulated college classroom. Students in the experimental sessions completed the prelecture questionnaire, viewed one of four videotaped lectures (low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization), wrote the recall and achievement tests, and completed the post-achievement questionnaire. Students who were in the control group completed the prelecture questionnaire, the achievement tests, and the post-achievement questionnaire. Finally, to ensure an educational learning experience, all students were debriefed.

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Insert Figure 2 about here

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Rationale for Design and Statistical Analysis

In order to test the research questions, an Expressive Instruction (low, high) by Organized Instruction (low, high) 2 x 2 design was implemented. First, a Bartlett-Box statistic from SPSS-X MANOVA procedure was employed in order to test for heterogeneity of variance because sample sizes were unequal. With an alpha level of .05 (i.e., $p < .05$), the dependent variables demonstrated no significant effects. Thus, heterogeneity of variance was not confirmed.

The research questions focused on the main effects of expressiveness and organization. The third question dealt with distinguishing the effect sizes of these behaviors. In order to address these questions, Expressive Instruction (low, high) by Organized Instruction (low, high) 2 x 2 ANOVAs were conducted and the main effects were investigated. Assuming that significant main effects only indicate a difference among treatment means that cannot be attributed to error (Howell, 1987), each significant effect was followed up by a measure of the magnitude of the experimental effect using omega-squared (ω^2; Hays, 1973; Tabachnik & Fidell, 1992). Although traditional research views values less than .030 (i.e., accounting for less than 3% of the variance) as too small to be practically significant, the exploratory nature of the present thesis provided reason to discuss them.

The combined effects of both teaching behaviors were also explored. Four types of teaching episodes were investigated: low expressive/low organization, low expressive/high organization, high expressive/low organization, and high expressive/high organization. The

following specific comparisons were of interest. First, the low expressive/low organization condition was thought to reflect poor teaching and thus produce lower learning outcomes than the low expressiveness/high organization, the high expressiveness/low organization, or the high expressive/high organization conditions. Second, high expressiveness/high organization was expected to be optimal teaching and therefore, hypothesized to yield better learning outcomes than any of the other three teaching episodes. Finally, the other two teaching conditions, low expressive/high organization and high expressive/low organization, were postulated to reflect other teaching conditions, differing only in the quality of the teaching behaviors representing them.

Given that organization, in comparison to expressiveness, demonstrated a stronger correlation with student achievement (Feldman, 1989), the low expressiveness/high organization condition was anticipated to be more effective than high expressiveness/low organization. Given the explorative nature of this research question, the familywise alpha level was set at .15. Thus, one-tailed Bonferroni t tests with alpha set at .025 for each contrast (i.e., six comparisons) were used with a critical $t_B(286) = 2.665$. The dependent variables included measures of attention and achievement.

Manipulation Checks

Teaching Manipulations

Researchers have compiled persuasive evidence regarding the validity of student ratings (Centra, 1979; Cohen, 1987; Feldman, 1989; Marsh, 1984; McKeachie, 1979). Thus, in order to ensure that the teaching manipulations were effectively portraying the teaching behaviors of interest, students ($n = 294$) rated the teaching behaviors. Using a 5-point Likert-type scale (i.e., 1 = "poor"; 5 = "outstanding"), students rated the videotaped lectures on 14 low and 3 high inference teaching behaviors. The 14 low inference items denoting the three lecturing behaviors of interest were extracted from Murray's (1983; 1987) Teacher Behaviors Inventory. The three high-inference items were added because they represent the global items found in most instructor evaluation questionnaires. Principle factors extraction with varimax rotation was performed using SAS on these 17 items. Three factors were extracted: organization, expressiveness, and clarity. The factor loadings and eigenvalues (or variances explained) are displayed in Table 2. The largest amount of variance was accounted for by factors loading on organization, followed by expressiveness and clarity.

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Insert Table 2 about here

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The items loading under each factor were summed and the means computed (i.e., item score/number of items), thereby creating three mean scores, one for each teaching behavior: expressiveness, organization, and clarity (range, 1 = "poor"; 5 = "excellent"). Each of these measures was used as a dependent variable in order to test the effectiveness of the manipulations. An Expressive Instruction (low, high) x Organized Instruction (low, high) 2 x 2 ANOVA demonstrated two significant main effects. First, a significant Expressive Instruction main effect was demonstrated on the expressiveness factor, $F(1, 293) = 128.99$, $MS_e = 0.61$, $p < .0001$, $\omega^2 = 0.30$ ($M = 2.97$; $SD = .83$; $n = 156$ vs. $M = 1.94$; $SD = .72$; $n = 138$). Second, a significant Organized Instruction main effect was demonstrated on the organization factor, $F(1, 293) = 439.66$, $MS_e = 0.56$, $p < .0001$, $\omega^2 = 0.60$ ($M = 4.06$; $SD = .58$; $n = 147$ vs. $M = 2.24$; $SD = .90$; $n = 147$). Finally, no significant Expressive Instruction (low, high) x Organized Instruction (low, high) interaction was found on clarity, $F(1, 293) = 0.01$, $MS_e = 0.76$, $p = 0.98$, indicating that the teaching behavior clarity, was not significantly different for any of the four teaching conditions. Based on these results, it was concluded that the videotape manipulations were verified. In other words, the type of teaching condition that students were exposed to was consistent with the intended manipulation of the teaching

behaviors. Students exposed to low expressiveness rated the teaching episode as low in expressiveness. This was the case for all four teaching conditions.

However, the means for the effective condition for expressiveness and organization were quite different (M = 2.97 vs. M = 4.06). Also, organization demonstrated an effect size twice that of expressiveness (ω^2 = 0.60 vs. ω^2 = 0.30), suggesting that the difference between effective and ineffective teaching in the organization manipulations was twice as strong as that of the expressiveness manipulations. These experimental findings indirectly reflect Feldman's (1989) correlational findings. The organization rating association with student achievement was almost twice that of expressiveness (see Table 1).

Clarity means for each lecture episode were closely clustered (M = 3.48; M = 3.94; M = 3.80; M = 4.22) and within close proximity to Murray's ineffective instructors' clarity scores (M = 4.01). Based on these outcomes, clarity was thought to be consistent across teaching manipulations and to reflect ineffective. Thus, the extraneous effects associated with clarity were thought to be minimal impact on student learning outcomes.

Presentation Sequence

In order to ensure that the achievement outcomes were not due to the time of experimentation (i.e., Monday through to Friday), but rather, due to the teaching manipulations, each condition was run twice, once in week one and once in week two. Furthermore, each of the four experimental conditions was randomly assigned to one of each of the sessions, for each of two weeks. As illustrated in Table 3, this resulted in a Week (week one, week two) x Teaching Condition (low expressive/low organization, low expressive/high organization, high expressive/low organization, high expressive/high organization) 2 X 4 design. A 2 x 4 ANOVA produced no significant interaction, $F(3, 287) = 0.39$, $MS_e = 4.98$, $p = .76$ or Week main effect $F(1, 287) = 2.72$, $MS_e = 4.98$, $p = .10$, on achievement, suggesting that the presentation sequence was counterbalanced. Table 3 displays the means and standard deviations.

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Insert Table 3 about here

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Instruction Effects

In order to address the instruction effects, a control group participated in a similar experimental condition as the experimental group, with the exception of not viewing any teaching videotapes (see Figure 2). A one-way Group (control, experimental) ANOVA demonstrated that the control group (M = 8.35; SD = 3.82; n = 85) had a lower achievement score than all the experimental groups (M = 15.75; SD = 5.02; n = 295), $F(1, 378) = 158.42$, $MS_e = 22.88$, $p < .0001$, $\omega^2 = 0.29$. Thus, the teaching conditions had an impact on student learning as compared to the control condition.

Results

To examine Feldman's (1989) ordering of expressiveness and organization experimentally, attention and achievement differences and the associated omega-squared values were determined for each teaching behavior. Based on the initial hypothesis, both teaching behaviors should demonstrate main effects on student learning outcomes. However, based on Feldman's (1989) correlational findings, the effects associated with organization should be greater than those associated with expressiveness. Instructor Expressiveness (low, high) x Instructor Organization (low, high) 2 x 2 between subjects ANOVAs were performed on attention and achievement outcomes to determine the effects associated with each teaching behavior. According to the main effects presented in Table 4, high, as compared to low, organization yielded higher levels of attention, as defined by a self-report item and a recall test, and achievement, as denoted by a recognition test and perceived amount learned. Furthermore,

three of the four significant main effects demonstrated practical effects (i.e., $\omega^2 > .30$). Thus, organization has an impact on student learning.

Insert Table 4 and 5 about here

In order to investigate the symbiotic/antagonistic relationship hypothesized to exist among different teaching behaviors, attention differences and achievement differences were determined for each teaching condition. Six a priori comparisons were performed to determine the effectiveness of each teaching episode. As seen in Table 5, combinations of expressiveness and organization differentially influenced student learning. Below, the comparisons are reported for each of the dependent variables associated with attention and achievement.

Attention

Two different indicators of attention, self-reported attention and a recall test, were used to measure the effectiveness of the teaching conditions. As predicted, the low expressive/low organization teaching condition had less of an impact on students' recall test scores than the high expressive/high organization teaching condition. Also, the high expressive/low organization teaching condition produced lower recall scores than either the low expressive/low organization or the high expressive/high organization teaching conditions.

Lecture achievement

Achievement measures, recognition, application, and perceptions of amount learned, were analyzed in order to assess the effectiveness of each teaching condition on measures of student learning. According to Table 5, the high expressive/high organization teaching condition yielded better recognition scores and perceptions of amount learned than either the low expressiveness/low organization or high expressive/low organization teaching conditions. Also, the low expressiveness/high organization teaching condition produced greater recognition scores than either the low expressiveness/low organization or the high expressiveness/low organization teaching conditions.

In summary, Table 5 demonstrates a number of patterns. First, and consistently on a number of dependent variables, the low expressive/low organization teaching condition is less effective than the high expressive/high organization teaching condition (i.e., comparison A-D). Second, simple organization main effects were observed in both the low (i.e., A-B) and the high expressiveness teaching conditions (i.e., C-D). Third, no simple expressiveness main effects were demonstrated on either the low (i.e., A-C) or the high organization teaching conditions (i.e., B-D). Fourth, the low expressive/high organization teaching condition was more effective than the high expressive/low organization teaching condition (i.e., B-C). As initially predicted, low expressiveness/low organization and high expressiveness/low organization are both ineffective teaching conditions, whereas low expressiveness/high organization and high expressiveness/high organization are both effective teaching conditions. These results extend the Manitoba studies in that attention and perceptions of achievement are also influenced by effective teaching.

Discussion

The present findings support Feldman's (1989) ordering of expressiveness and organization. Among a list of effective teaching behaviors, organization shows a higher correlation ($r = 0.57$) to student achievement than any other teaching behavior (Feldman, 1989). In the present study, organization, in comparison to expressiveness, causally impacts student attention and achievement outcomes (i.e., $\omega^2 > .030$). First, organization influences students' perceived (i.e., self-reported) and actual (i.e., recall) attention. According to cognitive theorists, selective attention is crucial for information processing (Meyer, 1975, 1977). Well-organized, as compared to highly expressive, presentations may provide the necessary structure for processing information. Moreover, the amount of effort required for processing relevant stimuli may be reduced and thus result in better attention outcomes.

Processing relevant stimuli from poorly organized lectures, on the other hand, may require greater allocation of cognitive resources. In so far as greater effort is required for disorganized presentations, students may be more easily distracted by irrelevant stimuli, experience loss of control of their learning environment, and therefore, do more poorly on measures of attention.

Second, organized teaching impacts students' perceived (i.e., self-reported) and actual (i.e., recognition) achievement outcomes. According to Jacoby (1983), a direct association exists between selective attention and learning, such that higher levels of attending produce better learning outcomes. Thus, students with higher levels of attention demonstrate higher perceived and actual achievement outcomes.

Third, organized teaching influences lower levels of information processing. According to Bloom's taxonomy (1956), achievement tests represent different levels of in-depth information processing. Recognition involves the correct identification of content from a large array of content with cues, whereas application requires the ability to use the general principles presented during the lecture in new or novel situations. Only lower level processing, such as recognition, and not the deeper or more critical thinking tasks, such as application, are impacted by organization. On intuitive grounds, this finding is expected. Unlike the real classroom, students did not have a chance to practice, review, or attempt to apply the material during or outside the classroom analog. Rather, students received a "one-time" only presentation of the stimulus material. As a result, differences in application are not found. Thus, organization causally impacts students' actual and perceived attention and achievement outcomes.

Organization Effects Explained

Three interpretations attempt to explain the influence of organization: the frustration hypothesis, the specific versus general orienting stimulus hypothesis, and the control hypothesis. According to the frustration hypothesis, exposure to communication that is not organized, but rather chaotic, may result in listener or audience frustration. For instance, students listening to an unorganized lecture may be very perplexed in trying to derive meaning from it. In an attempt to gain understanding, they may resort to skills of organizing the presented material. But this behavior may persist for only a short duration, yielding to the distraction of environmental stimuli. In other words, frustrated by the disorganized instruction and distracted by classroom stimuli, these students do poorly, scholastically. Presented with organized lectures, on the other hand, students are possibly provided with more cognitive structure and are thus more likely to focus on relevant stimulus material. The use of transitions in teaching, in turn, helps students organize the material, thereby enabling them to process relevant stimulus material (Land, 1979). Thus, well-organized teaching is crucial for student learning.

Alternatively, the specific/general orienting stimulus hypothesis suggests that a more specific, as compared to general, orienting stimulus, may be responsible for the effectiveness of organization. For instance, organization can be thought of as a specific orienting stimulus, directing students' attention to specific stimuli. Expressiveness, on the other hand, is more of a general orienting stimulus, encouraging students to pay attention to all stimuli. Each, then, would be necessary in captivating students' attention. However, enhancing attention to specific, as compared to all stimulus material, may be more advantageous for learning. In other words, helping students to focus on specific elements of the presentation, rather than the entire presentation, would seem more conducive for information processing. Thus, as a specific orienting stimulus, organization may have more of an impact on student learning, as compared to the more general orienting stimulus, expressiveness.

Third, the effectiveness of organization can be viewed in terms of increasing students' control. In other words, lectures presented in logical and organized chunks enhance students' processing of information, which, in turn, may enhance their feelings of control in the learning environment. Organized lectures, which provide clear outlines of the lecture presentation, may

instill in the student thoughts such as "I know where we are going, even if the teacher is boring". Thus, "teaching that helps students find a framework within which to fit new facts [i.e., lecture organization] is likely to be more effective than teaching that simply communicates masses of material in which the student can see no organization" (McKeachie, 1986, p. 229).

Disorganized teaching, on the other-hand, makes information processing difficult. The inability to process information may translate into feelings of loss of control over the learning environment. Loss of control, in turn, produces cognitive deficits, such as poorer scholastic outcomes (Perry, 1991). Thus, the impact of organization may work on the principle of influencing students' perception of control.

Expressiveness Effects Explained

In contrast, expressiveness results were not demonstrated as in previous studies (Coats & Smidchens, 1966; Feldman, 1989; Perry, 1991; McKeachie et al., 1986; Ware & Williams, 1975). The following arguments may account for this finding. First, the threshold at which expressiveness impacts student learning may not have been achieved. Accordingly, both student ratings and achievement should have been affected (Abrami et al., 1982; Feldman, 1989). In the present study, only student ratings reveal that high, as compared to low, expressive manipulation is an effective teaching behavior. However, the correlation between student achievement and student ratings of expressiveness was not statistically significant ($r = .051$, $p = .40$; vs. organization $r = .224$, $p < .0001$). According to Feldman (1994), the associations found between student achievement and lecture ratings of expressiveness are at best small or even modest (i.e., $r = .35$), occurring with larger sample sizes. The fact that the correlation is not demonstrated presently may indicate that the sample size was not large enough to boost the correlational index.

Second, a comparison between the effect sizes indicates an anomaly. Organization revealed an effect size ($\omega^2 = 0.60$) twice that of expressiveness ($\omega^2 = 0.30$). Based on this difference, organization may have had an advantage over expressiveness in impacting students' learning. But according to Feldman's (1989) correlational ordering, organization, in comparison to expressiveness, was expected to have a stronger effect on achievement outcomes.

Third, it is unclear whether or not previous studies controlled for other teaching behaviors during the expressiveness manipulation (with the exception of lecture content; Perry, 1991). Based on this premise, teaching behaviors such as organization and clarity may have been inadvertently manipulated. Thus, direct comparison of expressiveness ratings are difficult. Future research should have students rate the manipulation to ensure that the teaching behavior of interest is the only one being manipulated as perceived by students. Thus, a number of reasons may account for the lack of expressiveness findings on student attention and achievement outcomes.

The Symbiotic/Antagonistic Relationship Between Teaching Behaviors

The results of the four teaching conditions demonstrated that combinations of effective and ineffective teaching behaviors differentially influence student attention and achievement. The low expressiveness/high organization and high expressiveness/high organization teaching conditions were significantly superior to the low expressiveness/low organization and high expressiveness/low organization teaching conditions. The most parsimonious and reasonable explanation for these differences in teaching conditions suggests the following. First, both expressiveness and organization are important in impacting students' learning, however for different reasons. In the Manitoba studies, expressiveness is important for student achievement, whereas in the present study, organization is specifically crucial for enhancing student recall and recognition. Second, they operate at different levels. According to Feldman's (1989) meta-analyses, organization tends to have the largest correlation with student learning, followed by other teaching behaviors, including expressiveness. The present study

extends Feldman's correlational findings, demonstrating that organization, in comparison to expressiveness, has a large impact on student attention and achievement.

Third, and most significant to the present study, is the symbiotic/antagonistic relationship hypothesized to exist among combinations of teaching behaviors. In other words, different combinations of effective and ineffective teaching behaviors, have a different influence on student learning. First, they may complement each other and in turn, facilitate or enhance learning. For instance, the impact of high expressive/high organization yields significantly higher recall, recognition and perceptions of amount learned as compared to either low expressiveness/low organization or high expressive/low organization. Based on these findings, the combined influence of high levels of effective instruction, such as high expressiveness and high organization, compliment each other to produce higher levels of scholastic and related outcomes.

Second, the facilitative effects of one teaching behavior may be eliminated by the distracting characteristics of another, the antagonistic relationship. For example, students provided with the high expressiveness/low organization combination faired no better than students receiving low expressiveness/low organization. Based on these findings, poorly organized lectures may distract from or be antagonistic towards the facilitative effects of high expressiveness found in previous studies (Perry, 1991). Third, the facilitative effects of some teaching behaviors may not be influenced by the distracting effects of others. For instance, the low expressiveness/high organization combination did not thwart student learning, but rather, produced similar scholastic outcomes as the high expressiveness/high organization condition. In other words, low expressiveness, which has been demonstrated to thwart student learning (Perry, 1991), has virtually no impact on reducing the facilitative effects associated with high organization. Thus, both teaching behaviors are important for student learning, albeit for different reasons. Depending on the combination of teaching behaviors, student learning can be either facilitated or thwarted.

Summary

In essence, major advances in the understanding of the characteristics of effective instruction and student learning are addressed. Combining the results of the present thesis implies that certain teaching behaviors are effective because they have a universal effect on all students. For instance, organized teaching demonstrates consistent differences in student attention and achievement. In order to better understand the latter, more research is required.

Research Implications

Of greatest interest would be those conditions in which the teaching behaviors complement each other (i.e., symbiotic) to produce optimal learning conditions or compensatory effects (Perry, 1991) and those conditions in which they interfere (i.e., antagonistic) with each other to create less than optimal conditions. In the present study, the high expressiveness/high organization and low expressiveness/high organization teaching conditions demonstrate the former, whereas the high expressiveness/low organization and low expressiveness/low organization exemplify the latter. However, more research is needed to explain why these teaching behavior combinations are symbiotic or antagonistic toward each other.

Moreover, a number of other research issues have been generated by the present study. First, future research should investigate the specific information processing activities and learning behaviors associated with the specific attributes of expressive and organized instruction. According to Perry (1991), Murray (1991), and Schonwetter (1993), a number of links have been hypothesized (see Figure 1). These links require more empirical investigation in order to provide further rationale as to why these behaviors have such an impact on student learning. Research should focus specifically on how each of the attributes of these teaching behaviors influence student learning. Also, research needs to identify the specific cognitive processes that lead to the observed differences in student outcomes.

Second, field studies are needed. The present thesis represents learning only in the classroom analog, an environment created to simulate the actual college classroom. Furthermore, students were exposed to a "one-time" lecture episode without the chance of studying for the test. Exposure to a one 30-minute effective lecture episode may not be enough to enhance the learning experience of students with less adaptive learning orientations. A better measure of the lecture manipulations would be to provide students with consistent lecture behaviors over the duration of a course.

Also, a real classroom may provide students with the incentives to learn the material and thus increase the ego-involvement of students. Research attention should also be directed to other teaching behaviors that denote the lecture method and other teaching methods, such as group discussions, personalized instruction, seminars, and media (Dunkin & Barnes, 1986). By doing so, other teaching behaviors may be discovered that increase attention to task-relevant cues, enhance student learning, strengthen perceptions of control and motivate students to learn.

Finally, future research may rely on the complete variation of all independent variables instead of dichotomizing or trichotomizing variables as done traditionally (Perry, 1991) and in the present study. By applying continuous variables to regression analysis, a clearer picture may emerge regarding the teaching-learning phenomenon. For instance, structural equation modeling (Schonwetter, Clifton, & Perry, 1994) reveals that expressiveness is directly related to students' perceptions of amount learned, whereas organization is directly related to actual achievement outcomes. Students' perceptions of success are found to have a direct impact on their perceived and actual achievement outcomes, their affect, and motivation.

Educational Implications

Students seeking potentially effective instructors and administrators searching for potentially facilitative teaching should not only focus on elocutionary skills, but also on organization skills. Instructors concerned with the scholastic welfare of their students should focus on refining their organizational teaching skills. Also, rewards should be provided for instructors modeling effective teaching through high levels of organized lecture presentations. Attributes to be valued or rewarded should include: the instructor plans the activities of each class period in great detail, gives preliminary overview of lecture, puts outline of lecture on board, uses headings and subheadings, and signals transitions to a new topic (Feldman, 1989; Murray, 1991). Finally, workshops, seminars, and conferences on improving teaching through organizational teaching skills, should be made available for instructors who wish to enhance their teaching skills.

Finally, readers are cautioned when applying these results directly to the college classroom for the following reasons. First, learning occurred in a simulated, not actual college classroom. Second, students were exposed to a "one-time" lecture episode, and tested immediately without the chance of studying for the test or seeking additional help or resources. Third, video-taped lectures, as compared to live teaching, were used to present the stimulus material. Finally, novel lecture material was presented in order to control for any extraneous variables influencing student learning, such as previous knowledge. Thus, the limitations of the study would suggest that the results be used with caution.

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Table 1

Correlations Between the Instructional Dimensions of Effective Teaching and Student Achievement

Instructional Dimension	Correlation with Student Achievement
1. Organization	.57
2. Clarity & Understandableness	.56
3. Perceived Outcome or Impact of Instruction	.46
4. Stimulation of Interest in the Course and Its Subject Matter	.38
5. Encouragement of Questions & Discussion, & Openness to Opinions of Others	.36
6. Availability & Helpfulness	.36
7. Elocutionary (Expressiveness) Skills	.35
8. Clarity of Course Objectives & Requirements	.35
9. Knowledge of Subject	.35
10. Sensitivity to & Concern with, Class Level & Progress	.30
11. Enthusiasm for Subject or Teaching	.27
12. Instructor Fairness	.26
13. Intellectual Challenge	.25
14. Respect For Students	.23
15. Feedback to Students	.23
16. Course Material	.17
17. Supplementary Materials & Teaching Aids	.11

Note. Table adapted from Feldman (1989).

Table 2

Factor Loadings of Student Ratings of Effective Teaching

Low Inference Teaching Behaviors	Factor 1	Factor 2	Factor 3
Used outline	0.87660		
Used preliminary overview	0.87655		
Headings & subheadings	0.84053		
Signaled transitions	0.71878		
Wrote key terms on overhead	0.69368		
Was organized*	0.59380		
Facilitated note-taking	0.58652		
Used multiple examples			0.68598
Used concrete examples			0.68499
Repeated difficult terms			0.55899
Was clear*			0.47451
Gestured with hands & arms		0.80115	
Moved while lecturing		0.78039	
Varied speech & tone of voice		0.62970	
Made eye contact		0.62289	
Enhanced presentation with humor		0.58975	
Was expressive*		0.56393	
Eigenvalues	*4.9732*	*2.9356*	*2.1208*

Note. High inference items = *. All other items represent low inference items. Factor 1 represents organization; Factor 2 represents expressiveness; Factor 3 represents clarity.

Table 3

Achievement Outcome Means and Standard Deviations of the Effective Teaching Manipulations by Time of Week

Time	Low Expressive		High Expressive		Week Means
	Low Organization	High Organization	Low Organization	High Organization	
Week One					
M	14.23	16.39	13.84	16.54	15.36
SD	4.44	4.26	5.15	5.71	5.09
n	26	36	37	41	140
*Presentation Day**	*day 4*	*day 1*	*day 2*	*day 3*	
Week Two					
M	15.95	17.21	15.17	16.55	16.15
SD	4.69	5.50	4.66	4.83	4.94
n	38	39	47	31	155
*Presentation Day**	*day 1*	*day 3*	*day 2*	*day 4*	

Note. * = conditions were randomly assigned to one of four days for each of two consecutive weeks.

55

Table 4

Expressiveness (low, high) By Organization (low, high) 2 x 2 ANOVA's Summary

Table: Main Effects

Variable Category	DV's	IV's	Statistical Summaries	ω^2
Attention	Self-Reported Attention	exp	$F(1, 271) = 0.27$, $MS_e = 4.10$, $p = .61$	
		org	$F(1, 271) = 9.52$, $MS_e = 4.10$, $p < .005$	0.020
	Recall	exp	$F(1, 271) = 0.73$, $MS_e = 13.87$, $p = .39$	
		org	$F(1, 271) = 19.91$, $MS_e = 13.87$, $p < .0001$	0.052*
Achievement Performance	Recognition	exp	$F(1, 271) = 0.02$, $MS_e = 3.59$, $p = .88$	
		org	$F(1, 271) = 19.11$, $MS_e = 3.59$, $p < .0001$	0.051*
	Application	exp	$F(1, 271) = 0.02$, $MS_e = 12.17$, $p = .89$	
		org	$F(1, 271) = 2.79$, $MS_e = 12.17$, $p = .15$	
	Perceived Learning	exp	$F(1, 270) = 1.02$, $MS_e = 5.07$, $p = .31$	
		org	$F(1, 270) = 17.88$, $MS_e = 5.07$, $p < .0001$	0.045*

Note. * = practically significant ($\omega^2 > 0.03$); exp = expressiveness; org = organization.

Table 5

Means and Standard Deviations for Student Attention and Achievement Measures

	LOW EXPRESSIVE		HIGH EXPRESSIVE		BONFERRONI t tests (t = 2.67)					
	LOW ORGANIZATION (A)	HIGH ORGANIZATION (B)	LOW ORGANIZATION (C)	HIGH ORGANIZATION (D)	A-B	A-C	A-D	B-C	B-D	C-D
Attention Indicators										
Self-Reported[1]										
MEAN	6.65	7.48	6.87	7.51						
STD	2.28	1.80	2.21	1.77	2.40	0.65	2.45	1.90	0.09	1.96
Recall[2]										
MEAN	11.09	12.27	10.82	13.39						
STD	3.72	4.16	3.28	4.01	1.83	0.43	3.53	2.41	1.79	4.22
Achievement Indicators										
Recognition[3]										
MEAN	5.48	6.57	5.37	6.42						
STD	1.80	1.90	1.91	1.96	3.38	0.35	2.85	3.98	0.51	3.41
Application[4]										
MEAN	9.77	10.24	9.21	10.13						
STD	3.34	3.51	3.57	3.85	0.77	0.94	0.59	1.81	0.19	1.60
Perceived Learned[5]										
MEAN	4.05	4.75	4.18	5.56						
STD	2.18	2.34	2.35	2.43	1.76	0.33	3.76	1.54	2.11	3.69
n	64	75	84	72						

Note. [1]"Expressed in terms of percentages, how would you describe your attention to the lecture" (i.e., 1 = 10%; 10 = 100%). [2]Five minute free recall of lecture key words (maximum of 42 lecture unit ideas). [3] Ten multiple choice recognition items based on lecture. [4]Twenty multiple choice application items based on lecture. [5] "How much did you learn from the lecture" (1 = "not at all"; 10 = "very much so"). Boxed numbers indicate statistically significant t tests.

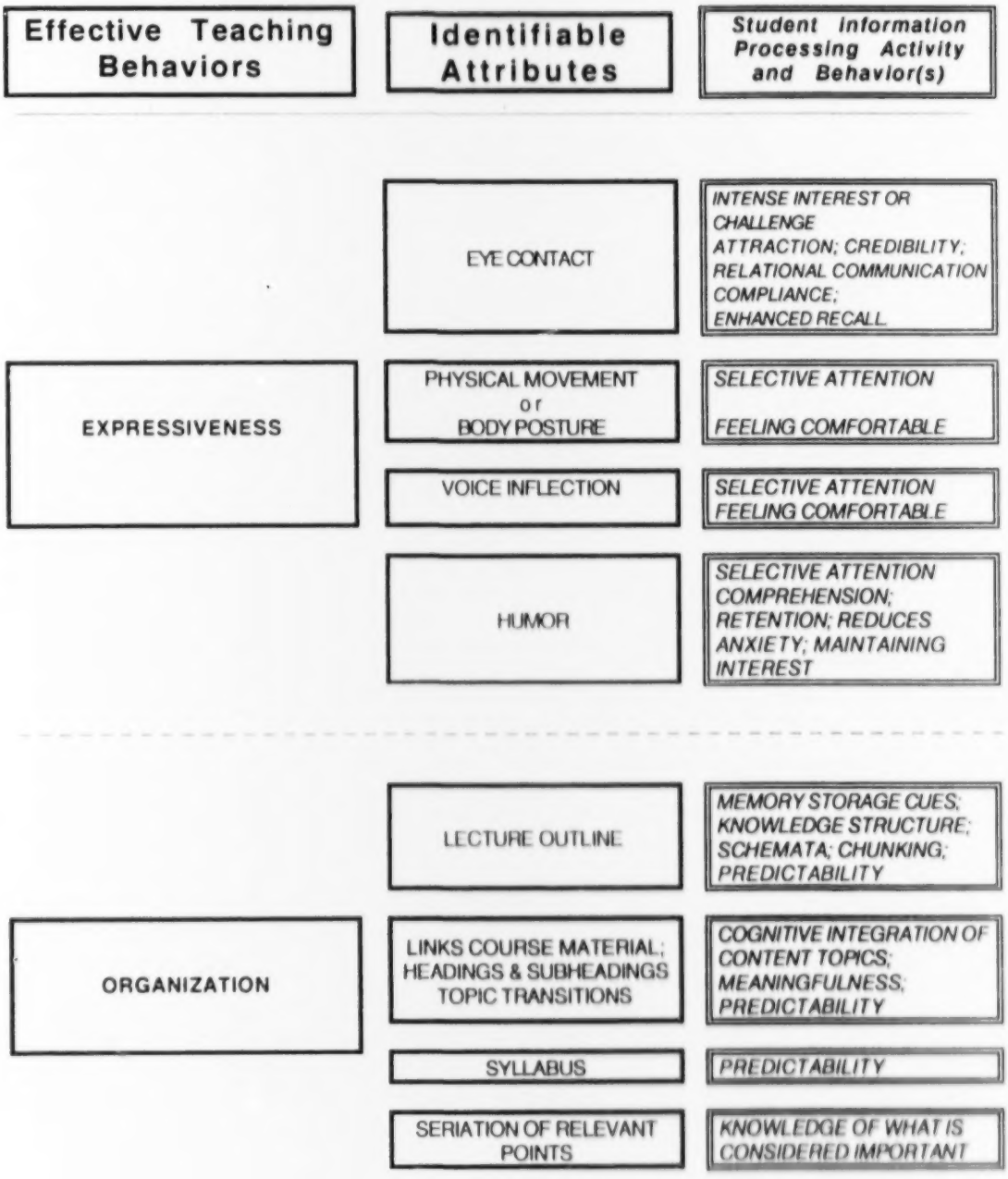

Figure 1. Effective teaching behaviors' influence on student learning and behavior (adapted from Perry, 1991).

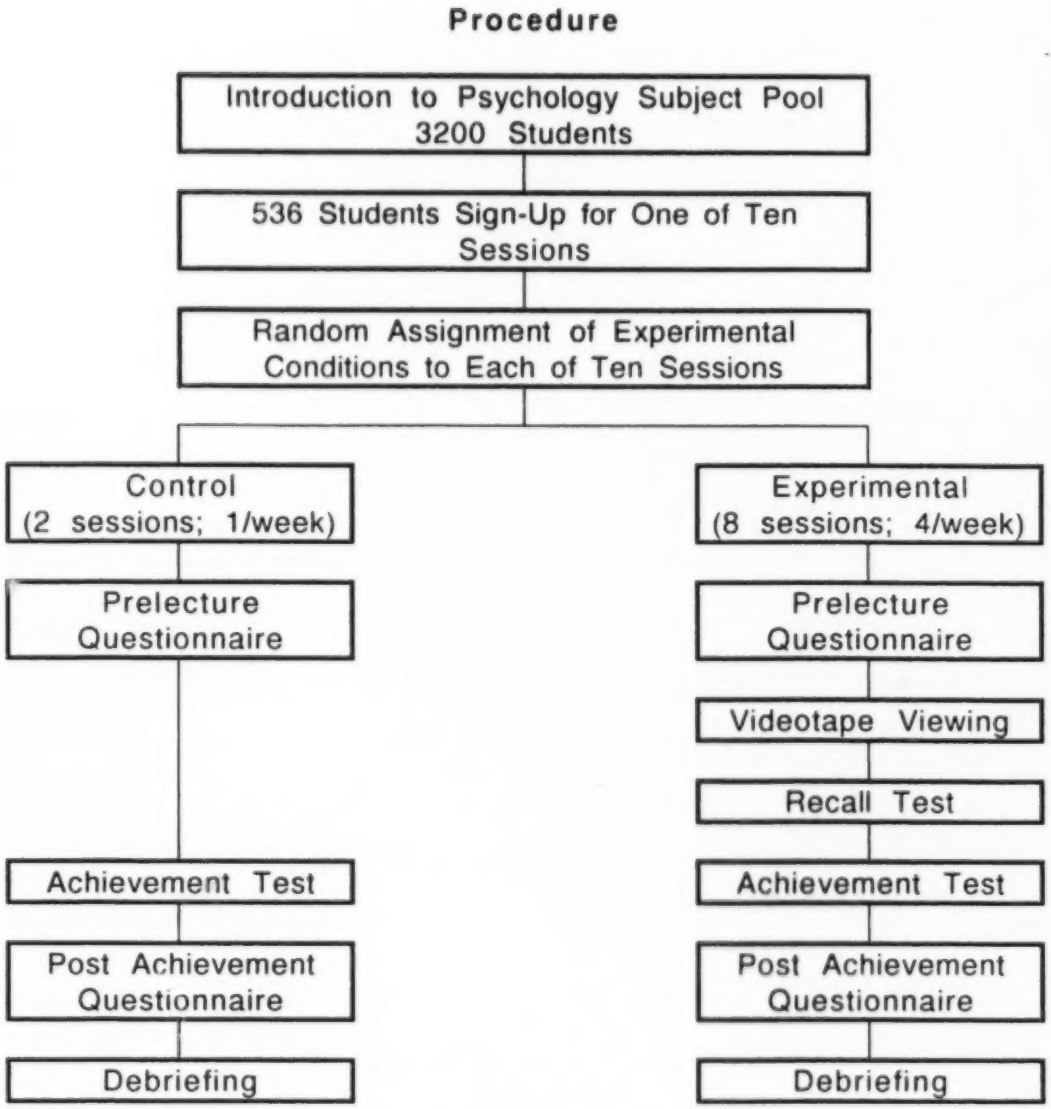

Figure 2. Experimental procedures of the control and experimental groups.